snags and solutions

A PRACTICAL GUIDE TO EVERYDAY ELECTRICAL PROBLEMS

Part 4

Emergency Lighting

to BS 5266 series
3rd Edition

COMPLIES WITH BS 5266-1: 2016

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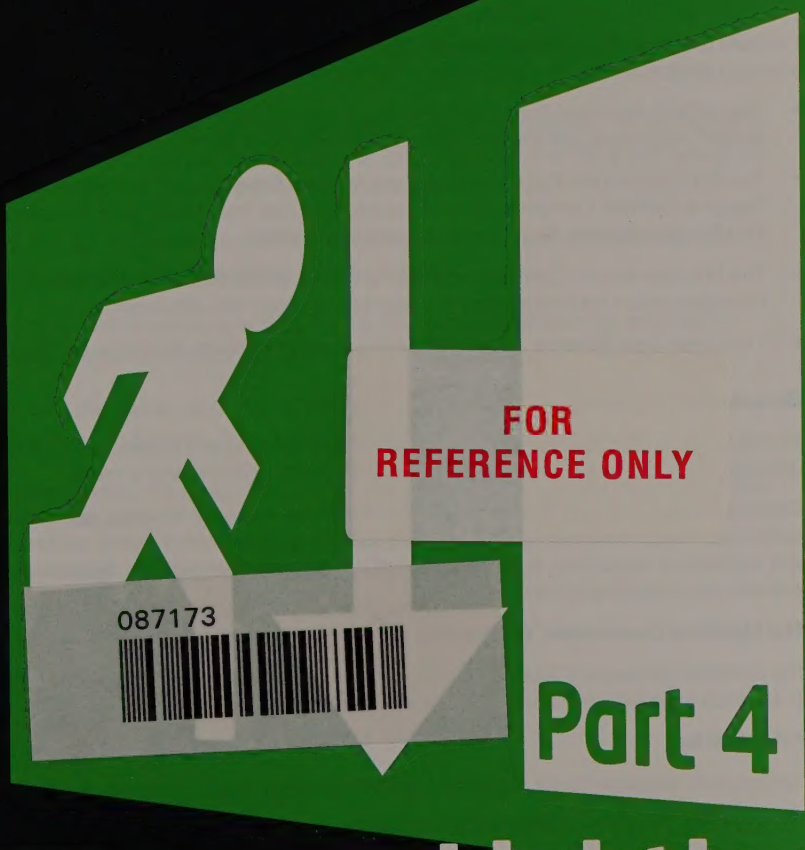

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Certsure

Certsure LLP is a limited liability partnership between the Electrical Safety First and the Electrical Contractors' Association (ECA) registered in England and Wales. Its brands include NICEIC the UK's leading voluntary regulatory body for the electrical contracting industry, which has been assessing the electrical competence of electricians for over fifty years and currently maintains a roll of over 26,000 registered contractors. It also includes ELECSA, who provide inspection, assessment and certification services to contractors working with electrical and renewable technology installations in private dwellings.

Certsure products are delivered through the NICEIC and ELECSA brands. The products include, amongst others:

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- The ELECSA and NICEIC Part P Domestic Installer Schemes, which register installers to Full Scope or Defined Competence for domestic electrical installation work in accordance with Part P of the Building Regulations in England and Wales.
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- The Green Deal Scheme, for energy saving improvements to dwellings and other buildings.

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Electrical Safety First (formerly the Electrical Safety Council) is an independent charity committed to reducing deaths and injuries through electrical accidents at home and at work.

Electrical Safety First is supported by all sectors of the electrical industry, approvals and research bodies, consumer interest organisations, the electricity distribution industry, professional institutes and institutions, regulatory bodies, trade and industry associations and federations, trade unions and local and central government.

The Electrical Contractors' Association

The Electrical Contractors' Association (ECA) is the leading trade association for contractors involved in electrical engineering projects in England, Northern Ireland and Wales.

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Preface

This NICEIC and ELECSA publication contains 50 snags and their respective solutions covering the design, installation, and inspection and testing of emergency lighting systems.

The snags have been specifically collated to complement the general recommendations given in the current version of the British Standard for emergency lighting, *BS 5266-1: 2016*, which came into effect on 31 May 2016.

Throughout this book references to the general recommendations of *BS 5266-1: 2016* are provided and, where appropriate, to other parts of the *BS 5266* series. In particular, *BS 5266-1* is intended to be used in conjunction with:

- *BS EN 50172: 2004* (dual numbered as *BS 5266-8: 2004*) which specifies the minimum provision of emergency escape lighting.
- *BS EN 1838: 2013* which specifies the luminous requirements for emergancy escape lighting and standby lighting systems.

Details of the standards and the legislation that applies to emergency lighting systems are given in Section One of this publication.

For ease of reference, the snags and corresponding solutions are arranged under the following nine sections:

- Legislation and standards
- Classifications of emergency lighting systems
- Design considerations
- Wiring systems
- Luminaires
- Signage
- Servicing and maintenance
- Certificates
- Way guidance systems

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How to use this book

In these books of Snags and Solutions, a red circle or rectangle on the left hand page illustrates the snag. Red triangles may be used to draw attention to what exactly is going wrong.

Where it is unclear what the snag relates to, for example, where an inspector is faced with one or more options, a question mark and/or cartoon 'Sparky Tony' illustrates the problem.

The green circle or rectangle, generally on the right-hand page, illustrates the solution.

Legislation and standards

Snag 1 Legislation applying to emergency lighting systems

Some form of emergency lighting is required in virtually all workplaces and non-domestic buildings that rely on artificial lighting.

Snag 2 Risk assessment

A fire safety risk assessment must be carried out at all workplaces, commercial premises and in buildings to which the public have access.

Snag 3 British Standards applicable to emergency lighting installations

Emergency lighting systems should be designed and installed to achieve compliance with the relevant parts of the *BS 5266* series.

Snag 4 Building Regulations

Buildings must be designed and constructed in such a way that the health and safety of persons in or about those buildings is not compromised in any way.

Classifications of emergency lighting systems

Snag 5 Forms of emergency lighting

'Emergency lighting' is the generic term used to describe specific forms of lighting used to provide illumination when the supply to the normal lighting fails.

Snag 6 Types of emergency luminaires

The BS 5266 series classes emergency lighting luminaires as either 'self-contained' or 'centrally supplied'.

Snag 7 Modes of operation

Emergency luminaires are attributed a 'mode of operation', according to whether they are 'on' all of the time or 'on' only during periods when the supply to the normal lighting has failed.

Snag 8 Facilities

Additional devices and/or features, referred to as 'facilities' in *BS 5266-1*, can be added to or incorporated into emergency lighting luminaires.

Snag 9 Duration period

Where the immediate reoccupation of a building is required, the emergency escape lighting system should have sufficient battery capacity (duration) to facilitate this.

Design considerations

Snag 10 Classification of system

To support designers of emergency lighting systems, *BS 5266-1* provides guidance on the systems that are suitable for typical types of premises.

Snag 18 Illuminance for specific locations

Adequate illumination should be provided to allow essential tasks to be performed or concluded safely.

Snag 19 Lift cars, moving stairways and walkways

Lift cars, moving stairways and walkways should be illuminated as if they were part of an escape route.

Snag 20 Emergency lighting in toilets

Emergency lighting is required in some toilet facilities.

Snag 21 Response times

When a loss of supply to the normal lighting occurs, any provision of emergency lighting must come into operation promptly, to prevent confusion and panic arising.

Wiring systems

Snag 22 Use of combustible supports and fixings (such as plastic clips or ties)

The cables of an emergency escape lighting system should not be supported or fixed solely by combustible products (such as plastic clips).

Snag 23 Joints

A joint in a cable of a centrally supplied system should, wherever possible, be inside the component parts of an emergency lighting system.

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Luminaires

Snag 31 A suitable type of emergency luminaire

A luminaire that provides illumination in an emergency situation must be specifically designed and constructed for that purpose.

Snag 32 Mounting height of luminaires

An emergency lighting luminaire should normally be mounted at least 2 m above the floor, but a different height may be more appropriate to a particular application following risk-assessment.

Snag 33 Photometric data

Reputable manufacturers of emergency lighting luminaires publish photometric data to help designers determine how many luminaires will be needed to meet minimum levels of illumination.

Snag 34 Disability glare

An emergency luminaire should be selected and positioned carefully so that the light produced by it when in operation will not dazzle anyone.

Snag 35 Batteries

Batteries that provide the standby power supply for emergency luminaires must be able to operate when required.

Snag 48 Periodic inspection and testing of an emergency lighting installation

An emergency lighting installation should be inspected and tested by a 'competent person' at least once a year, and an Emergency Lighting Periodic Inspection and Test Certificate issued.

Snag 49 Verifying emergency lighting systems of existing premises

Premises that cannot provide valid emergency lighting documentation should be inspected for compliance with current emergency lighting standards.

Way guidance systems

Snag 50 Low mounted way guidance systems

As smoke rises and spreads at ceiling level, the use of a low mounted way guidance system can assist occupants to move to a place of safety.

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Legislation applying to emergency lighting systems

Some form of emergency lighting is required in virtually all workplaces and non-domestic buildings that rely on artificial lighting.

Snag 1

Being unaware of the legislation that requires workplaces and premises that are open to the public to incorporate emergency lighting may put employers, designers or installers of such systems at risk of prosecution.

Solution

Although it is not a legal requirement for all premises to have emergency lighting, due to legislation covering health and safety, fire and building regulations, emergency lighting is generally required in most, if not all, workplaces and non-domestic premises. While the particular legislation applicable to various parts of the UK may differ, similar requirements will apply in all parts. Some of the most relevant items of legislation include the following:

Health and Safety at Work etc Act 1974

This is the primary UK health and safety legislation and places a duty on employers to provide a safe workplace for employees. However, details of what the Act requires employers to do is set out in *The Management of Health and Safety at Work Regulations 1999,* and the main requirement of these regulations is that employers should undertake a regular risk assessment on their premises. For premises employing five or more persons employers need to record the significant findings of the risk assessment.

The Regulatory Reform (Fire Safety) Order 2005 (FSO)

This is the primary fire safety legislation applicable to England and Wales, which came into effect in 2006. The FSO replaced most of the fire legislation that existed at the time, and applies to virtually all types of premises apart from private homes and individual flats.

Before 2006, the fire service used to carry out risk assessments at business premises and for 'compliant premises' a fire certificate was duly issued. However, under the FSO, it is now the responsibility of the employer (or person with control over the premises) to implement a system of regular fire risk assessments on their premises, which includes an assessment of the emergency lighting provision. The FSO requires a 'responsible person' to be appointed to supervise/manage the risk assessment process and, where applicable, maintain records.

Similar legislation covering non-domestic premises also applies in Scotland and Northern Ireland. However, although the duties are the same, the 'responsible person' is referred to as the 'duty holder' in Scotland and the 'appropriate person' in Northern Ireland.

For further Information on risk assessment, refer to Snag 2.

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Building Regulations

The primary purpose of building regulations is to provide for the health and safety of people in around buildings and for such purposes requirements covering the provision of emergency lighting for non-domestic premises are included within the building regulations appropriate to the particular part of the UK. Guidance on complying with building regulations is made available for each respective part of the UK (refer to Snag 4).

The following table shows some of the most relevant UK legislation covering the provision of emergency lighting systems.

Relevant legislation applicable to emergency lighting systems in the UK

Legislation[1]	UK Location			Property type		
	England & Wales	Scotland	Northern Ireland	Dwellings	Houses in Multiple Occupation (HMO)	Commercial/ Industrial
The Regulatory Reform (Fire Safety) Order 2005	•			•[2]	•	•
Building Act 1984	•			•	•	•
The Building Regulations 2010	•			•	•	•
The Management of Houses in Multiple Occupation (England) Regulations 2006	•				•	
Building (Scotland) Act 2003		•		•	•	•
Housing (Scotland) Act 2010		•		•	•	
Fire (Scotland) Act 2005		•		•	•	•
The Building Regulations (Northern Ireland) 2012			•	•	•	•
The Fire Safety Regulations (Northern Ireland) 2010			•	•[2]	•	•
The Health and Safety (Safety Signs and Signals) Regulations 1996	•	•		•[2]	•	•
The Health and Safety (Safety Signs and Signals) Regulations (Northern Ireland) 1996			•	•[2]	•	•

• Indicates which legislation applies to a location or property.

[1] Any listed legislation can be downloaded free from: **www.opsi.gov.uk**

[2] This legislation may apply in some dwellings, for example, to a part of a dwelling used solely for business use, or the common parts of blocks of flats.

Premises that require a licence, or need to be registered with the local authority

It should be appreciated that the failure of the supply to the normal lighting in certain types of premises, such as a night club, could result in an increased risk to the safety of occupants. As a result, such premises are required to be licensed with the local authority and must adhere to any specific emergency lighting requirements stipulated by the local authority. Examples of such premises include:

- places of public entertainment (such as a cinema, music and dance hall, or a theatre)
- places that permits gambling and/or the sale of alcohol
- sports stadia, and
- certain types of House in Multiple Occupation (HMO).

For similar reasons, the following premises are required to be registered with the local authority:

- nursing homes
- childrens' homes
- residential care homes, and
- independent schools.

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Risk assessment

A fire safety risk assessment must be carried out at all workplaces, commercial premises and in buildings to which the public have access.

Snag 2

An employer or anyone who has control over non-domestic premises and locations (such as the common parts in blocks of flats) that fails to carry out and, in particular, implement and maintain a fire management plan, could be putting lives at risk.

Solution

Fire safety law changed in October 2006 with the introduction of the Regulatory Reform (Fire Safety) Order 2005 (FSO). The FSO replaced over 70 pieces of fire safety law and applies to all non-domestic premises in England and Wales, including the common parts of blocks of flats and houses in multiple occupation (HMOs). Under the FSO, the 'responsible person' must carry out a fire safety risk assessment and implement and maintain a fire management plan.

For information on the legislation that applies in Scotland and Northern Ireland, and the equivalent terms used for the 'responsible person', refer to Snag 1.

Who is the responsible person?

A 'responsible person' is the person who has control of premises or has a degree of control over certain areas or systems within the premises. The person or persons could be:

- the employer
- the managing agent or owner for shared parts of premises or shared fire safety equipment such as fire-warning systems or sprinklers;
- the occupier, such as self-employed people or voluntary organisations if they have any control; or
- any person responsible for servicing, maintaining, and inspecting and testing the emergency lighting system.

What is involved in a risk assessment?

A fire safety 'risk assessment' should identify any hazards that occupants may be exposed to should a fire occur on the premises. Once identified, the responsible person must decide whether the risk to the safety of the occupants is acceptable, or whether measures should be taken to minimise the risk(s).

Amongst other things, the responsible person should verify that:

- all routes to emergency exits from premises and the exits themselves are kept clear
- all emergency routes and exits lead as directly as possible to a place of safety
- emergency routes and exits requiring illumination are provided with emergency lighting of adequate intensity in the case of failure of their normal lighting
- emergency routes and exits are indicated by signs.

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A five-step guide to carrying out a risk assessment on an existing emergency lighting system is shown below:

Step 1: Identify hazards

The first step in any risk assessment is to identify safety risks to occupants of the premises. Examples of potential risks relating to the emergency lighting system include finding inadequately signed and/or are poorly illuminated escape routes.

Step 2: Identify who might be at risk

Careful consideration should be given to the individual needs of the occupants, as this helps to identify the best way to manage the risk(s). The time required to achieve safe exit should be assessed on the slowest option. For example, consideration must be given to the needs of the elderly, disabled persons or pregnant women to achieve safe exit from the premises, including identifying any assistance that may be required.

Step 3: Evaluate the risk, and act (accordingly)

The type and level of risk to occupants should be evaluated so that a decision can be made as to what needs to be done next. Where the supply to the normal lighting fails in a location not forming part of the defined escape route(s), additional emergency safety lighting may need to be installed. For example, increased levels of emergency illuminance may be needed as part of a 'stay put' strategy or to allow the safe shut down of equipment.

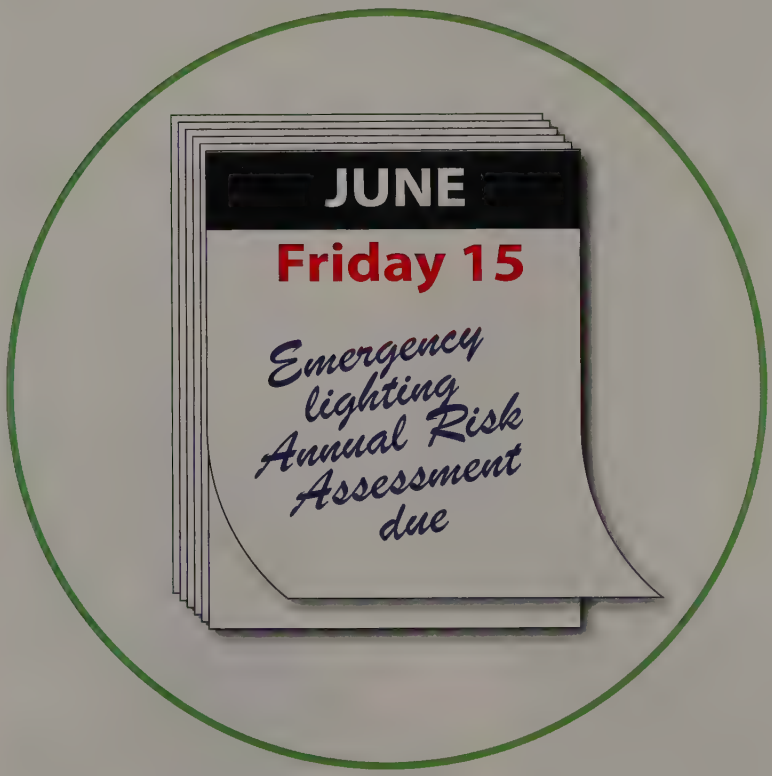
Step 4: Record findings, plan and train

It is a good idea to keep a record of all hazards identified, and what action was taken to reduce or remove them. Such information may also need to be shared with staff and/or visitors. Where there are five or more staff, or a premises (such as a nightclub) requires a licence, the findings of the risk assessment must be recorded. Example outcomes of a risk assessment could be that staff need training/retraining or that new/additional luminaires need installing, to improve lighting levels.

Step 5: Review, and revise (if necessary)

Risk assessments must be regularly reviewed as, over time, the risks can change. For example, staffing levels and/or the number of occupants can increase. The layout of the building should also not be overlooked as it may have altered in some way following any building work.

Unless circumstances dictate otherwise, risk assessments should be reviewed annually. Even if nothing is found to be different since the last inspection, this should be recorded in the risk assessment document(s), to indicate to others that a review has taken place.



Note: For guidance on controlling risks in the workplace refer to the HSE website: www.hse.gov.uk/risk/controlling-risks.htm

British Standards applicable to emergency lighting installations

Emergency lighting systems should be designed and installed to achieve compliance with the relevant parts of the *BS 5266* series.

Snag 3

Where designers fail to comply with the relevant requirements and recommendations of the emergency lighting standards applicable to the work, people may be placed in danger.

Solution

Those involved in the design, installation and maintenance of emergency lighting systems should be familiar with the the following interdependent standards.

BASE GUIDANCE

BS 5266-1: 2016
Emergency lighting
Part 1: Code of practice for the emergency lighting of premises

SYSTEM STANDARDS

BS EN 1838: 2013
Lighting applications
Emergency lighting

BS EN 50172: 2004
(BS 5266-8: 2004)
Emergency escape lighting systems

PRODUCT STANDARDS

BS EN 50171: 2001
Central power supply systems

BS EN 60598-2-22: 2014
Luminaires for emergency lighting

BS EN 62034: 2012
Automatic test systems for battery powered emergency escape lighting

BS 5266-1: 2016, Emergency lighting – Part 1: Code of practice for the emergency lighting of premises

This 'base guidance' came into effect on the 31 May 2016, replacing the existing standard, *BS 5266-1: 2011*, which was subsequently withdrawn. *BS 5266-1: 2016* provides general guidance and recommendations on the design, installation and wiring of emergency lighting systems in all premises other than dwellings.

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The recommendations and guidance given in *BS 5266-1* are intended for the following purposes:

- to assist occupants to leave premises in an emergency
- to protect persons who stay in the building during an emergency
- to help occupants continue with normal operations in the event of failure of the normal supply.

Depending on the system, other parts of the *BS 5266* series may also apply, which include:

Part 2: ***Code of practice for electrical low mounted way guidance systems for emergency use.***

Part 4: ***Code of practice for design, installation, maintenance and use of optical fibre systems.***

Part 5: ***Specification for components parts of optical fibre systems.***

System standards

BS EN 1838: 2013 Lighting applications - Emergency lighting

This standard specifies the luminous (illumination) requirements for emergency lighting systems installed in premises or locations primarily used by the public or employees. The particular areas covered include the minimum illuminance required for escape routes, open-areas and high risk task areas. The requirements for illumination of safety signs and calculations for maximum permitted viewing distances are also included.

BS EN 50172: 2004 (BS 5266-8: 2004) Emergency escape lighting systems

This standard specifies the minimum provision of emergency escape lighting required in offices and multi-story buildings that are open to the public. Covering the illumination of escape routes when the supply to the normal lighting fails, the minimum recommendations specified are based on the size, type and usage of the premises.

The standard covers a variety of topics including the design of emergency lighting and, on completion of the work, the need for drawings of the system to be provided, and for these to be regularly updated with any subsequent changes to the system. It also gives best practice on the servicing and testing of emergency lighting systems.

Product standards:

The following product standards are referenced in *BS 5266-1* and other emergency lighting standards.

BS EN 50171: 2001 Central power supply systems

This standard specifies the requirements for central power supply systems for luminaires for emergency lighting.

BS EN 60598-2-22: 2014 Luminaires for emergency lighting

This standard details the specification requirements for emergency luminaires, including self-contained and centrally powered luminaires for use in emergency lighting systems.

BS EN 62034: 2012 Automatic test systems for battery powered emergency escape lighting

This standard specifies automatic test systems for battery powered emergency lighting as conventional techniques for testing are reliant upon manual procedures, which are susceptible to neglect.

Building Regulations

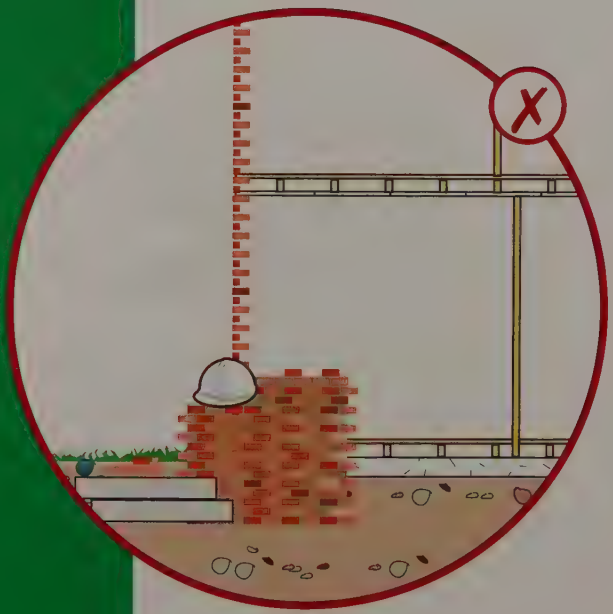
Buildings must be designed and constructed in such a way that the health and safety of persons in or about those buildings is not compromised in any way.

Snag 4

Where designers and builders fail to provide the appropriate level of emergency escape lighting in a new or a materially altered building, they could be in breach of the relevant Building Regulations applicable in that part of the UK, namely:

- Building Regulations 2010 (England and Wales)*, or
- Building (Scotland) Regulations 2004, or
- Building Regulations (Northern Ireland) 2012.

** From 31 December 2011, the power to make Building Regulations for Wales was transferred to Welsh Ministers. Therefore for some parts of the building regulations, separate Approved Documents are published for use in England, and for use in Wales, respectively.*



Solution

When a building is erected and/or materially altered, the relevant requirements of Building Regulations must be satisfied to ensure that the building is constructed in such a way that the health and safety of the occupants and those in the vicinity of the building is not compromised.

Guidance on where emergency lighting should be installed is given in Table 9 of Approved Document B (Fire safety) Volume 2 - Buildings other than dwellinghouses;

- for use in England, 2006 edition (incorporating 2010 and 2013 amendments), and
- for use in Wales, the 2006 edition (incorporating 2010, 2013 and 2016 amendments).

The guidance has been reproduced in the following table for ease of reference:

Table 9 Provision for escape lighting

Purpose group of the building or part of the building	Areas requiring escape lighting
1. Residential	All common escape routes[1], except in 2-storey flats
2. Office, storage and other non-residential	a. Underground or windowless accommodation b. Stairways in a central core or serving storey(s) more than 18 m above ground level c. Internal corridors more than 30m long d. Open-plan areas of more than 60m^2
3. Shop and commercial and car parks	a. Underground or windowless accomodation b. Stairways in a central core or serving storey(s) more than 18 m above ground level c. Internal corridors more than 30 m long d. Open-plan areas of more than 60 m^2 e. All escape routes to which the public are admitted[1] (except in shops of three or fewer storeys with no sales floor more than 280 m^2, provided that the shop is not a restaurant or bar)
4. Assembly and recreation	All escape routes[1], and accommodation except for: a. accommodation open on one side to view sport or entertainment during normal daylight hours
5. Any purpose group	a. All toilet accommodation with a floor area over 8 m^2 b. Electricity and generator rooms c. Switch room/battery room for emergency lighting system d. Emergency control room

[1]Including external escape routes.

Almost identical guidance on where emergency lighting should be installed in premises in Scotland and Northern Ireland can be found in the Technical Handbook (Non-domestic) and the Technical Booklet E, respectively.

Forms of emergency lighting

'Emergency lighting' is the generic term used to describe specific forms of lighting used to provide illumination when the supply to the normal lighting fails.

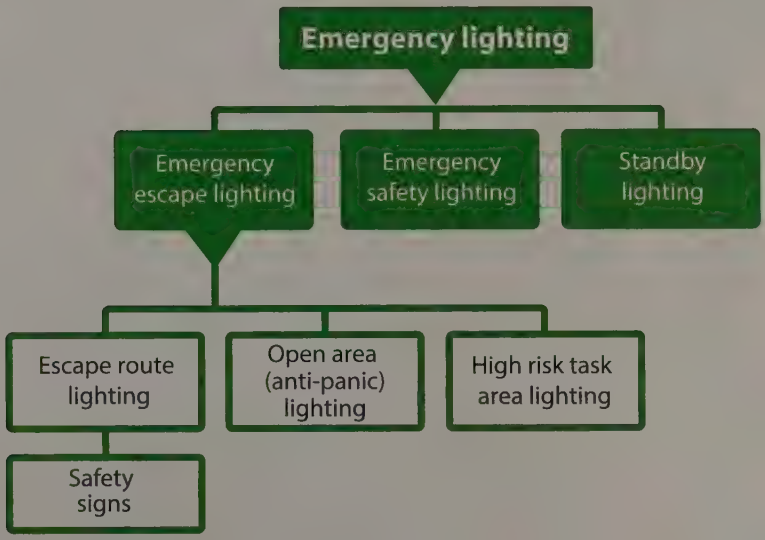
Snag 5

Where a room (or building) is plunged into darkness, due to a power cut (for example), and no form of emergency lighting has been provided, some people might become stressed and even panic, especially those who are not familiar with the building or its layout.

Solution

The purpose of emergency lighting is to ensure illumination is provided promptly, automatically, and for a suitable amount of time in a specific area, when the supply to the normal lighting fails.

BS 5266-1: 2016, includes guidance and recommendations for the following types of emergency lighting:



Emergency escape lighting

Emergency escape lighting is provided to enable people to move to a place of safety, such as outside the building, in the event of failure of the supply to the normal lighting. This type of emergency lighting forms part of the fire protection system of a building, and falls into one of three groups, namely:

- **Escape route lighting.** The purpose of this lighting is to enable occupants to move to a place of safety (such as outside the building) by providing appropriate visual conditions and direction-finding on escape routes and in special areas/ locations. It is also used to ensure that fire-fighting and safety equipment can be readily located and used such as in corridors and stairways, (Clause 5.2 of *BS 5266-1* refers).

- **Open area (or anti-panic) lighting.** This type of lighting forms part of the emergency escape lighting. Its purpose is to help reduce the likelihood of panic and to enable safe movement of occupants towards escape routes by providing appropriate visual conditions and direction finding, such as in large rooms and/or open areas, (Clause 5.2.6 of *BS 5266-1* refers).

- **High risk task area lighting.** This part of the emergency escape lighting is to safeguard the people involved in a potentially dangerous process or situation. Its purpose is to enable shut-down procedures to be properly carried out in a way that the operator and other occupants of the building are not put into harm's way, such as by walking into dangerous machinery, (Clause 5.2.7 of *BS 5266-1* refers).

- **Safety signs.** A sign that gives a general safety message. The message is portrayed by a combination of colour, geometric shape and a graphical symbol, (Clause 5.2.9 of *BS 5266-1* refers).

Emergency safety lighting

Based on the particular risk assessment, emergency safety lighting may need to be provided in accordance with Clause 5.3 of *BS 5266-1,* for the safe movement of persons in premises that are not intended to be evacuated immediately on loss of the normal lighting supply.

Standby lighting

As can be seen from the diagram on the previous page, standby lighting is not classed as emergency escape lighting. This is because, where there is a loss of supply to the normal lighting (say, due to a power cut), standby lighting is used to provide a reasonable level of illumination so that normal activities can continue without too much disruption. However, where the level of light provided by the standby lighting is lower than the normal level of lighting for that area/building, the standby lighting should be used only to terminate or shut-down processes.

Standby lighting does not usually form part of the fire protection system of the building. However, where it is used for emergency escape lighting purposes, it must comply with the relevant requirements of *BS EN 1838: 2013 Lighting Applications – Emergency lighting.*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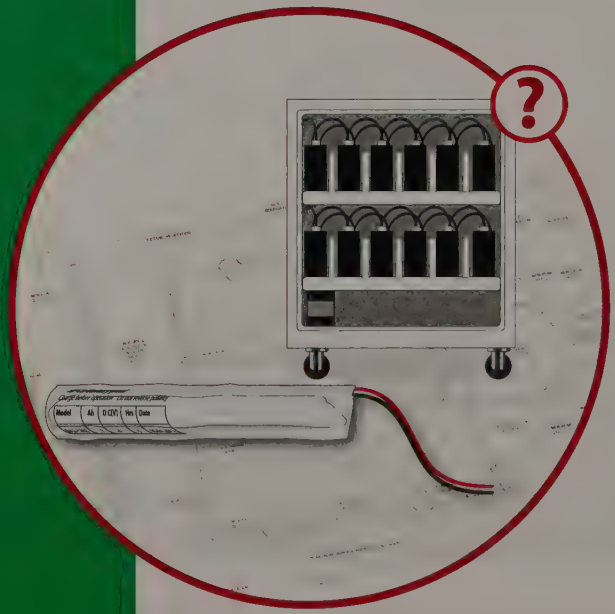
Types of emergency luminaires

The *BS 5266* series classes emergency lighting luminaires as either 'self-contained' or 'centrally supplied'.

Snag 6

For some premises, even though a centrally supplied system may have been more appropriate than a self-contained system, the advantages and disadvantages of both systems were not fully considered during the design stage.



Solution

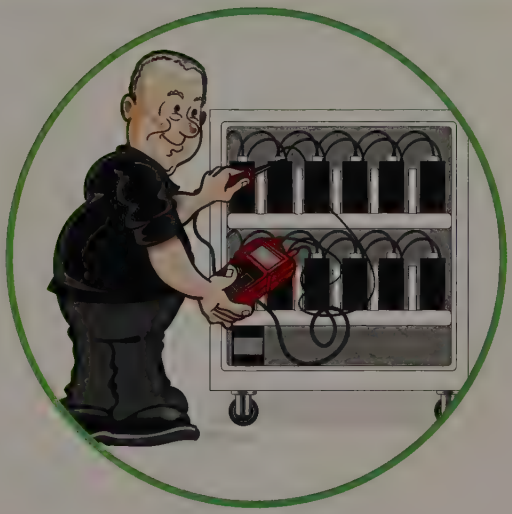
Designers and specifiers of emergency lighting systems can choose to install either a number of self-contained emergency luminaires (that have their own standby battery supply within or adjacent to the luminaire) or, a number of dedicated 'slave' luminaires (connected directly to a remote power source, such as a standby generator or a central battery unit).

The selection of one system (self-contained or centrally supplied) over the other will often be made on the basis of a number of factors. These include, the building size, usage, cost of installation and maintenance and servicing.

Some of the main advantages and disadvantages of each type of system are discussed overleaf.

In order to identify one type of luminaire from another, every emergency luminaire should be marked externally with a letter, as indicated in Annex F of *BS 5266-1* and shown below (Clause 6.6 of *BS 5266-1* refers).

Type of luminaire	Identification letter
Self-contained	X
Centrally supplied	Z



X (Self-contained luminaires)

Advantages:

- Equipment is less costly and can be quicker to install (as self-contained emergency luminaires are not required to be supplied by cables that have fire-protecting properties).
- System integrity is considered to be good (as each luminaire is independent of others).
- Additional luminaires can be easily added to the system.

Disadvantages:

- Possible adverse effects to battery life and performance if the installation is in premises where environmental conditions (such as humidity and ambient temperature) vary throughout a building.
- Battery pack for each luminaire needs replacing periodically (e.g. every few years), depending upon application.
- Difficult to isolate and monitor one or more luminaires in larger installations.

Z (Centrally supplied luminaires)

Advantages:

- Battery maintenance and routine testing is easier to do as the batteries are all in one location.
- Battery life can be up to 25 years, dependent upon type.
- Luminaires can operate in relatively low and high ambient temperatures without worrying about battery life and performance.

Disadvantages:

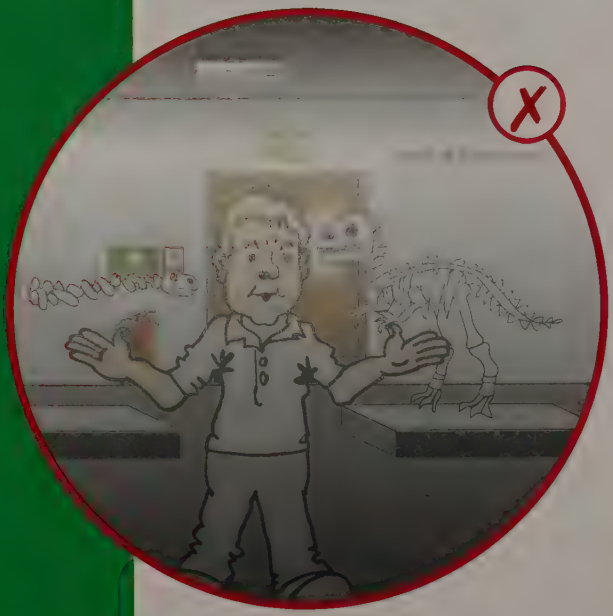
- Higher equipment costs.
- The cables or wiring system used for the connection of the emergency luminaires to the standby supply must adequately resist the effects of fire and mechanical damage, which can be more costly and time-consuming to install.
- Poor system integrity – failure of battery or wiring circuit can disable a large part of the system.
- A ventilated 'battery room' will be needed within the building, to house the cells and charging equipment etc.
- Localised mains failure in a particular area may not trigger operation of emergency lighting in that area.

Modes of operation

Emergency luminaires are attributed a 'mode of operation', according to whether they are 'on' all of the time or 'on' only during periods when the supply to the normal lighting has failed.

Snag 7

As a consequence, of the 'mode of operation' selected for an emergency lighting system being inappropriate for the size and function of the particular type of premises, persons have been placed at increased risk in emergency conditions.



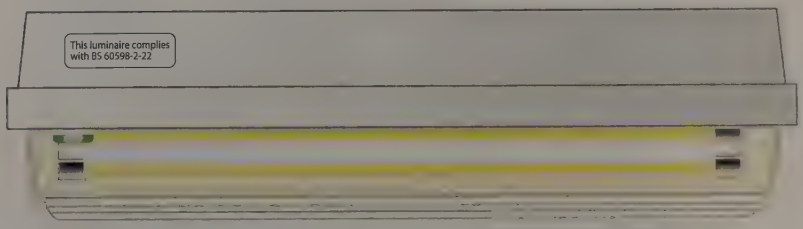
Solution

The luminaires of an emergency lighting system are described as having a particular mode of operation, according to whether they will be 'on' all of the time (maintained), or, 'on' only during periods when the supply to the normal lighting has failed (non-maintained). Emergency luminaires can be either stand alone units or incorporated ('combined') into luminaires used for the normal lighting.

Seven modes of operation are listed in Annex F of *BS 5266-1*, as follows:

(0) **Non-maintained emergency luminaire** is one in which the lamp of the emergency luminaire is 'on' only when the supply to the normal lighting has failed.

A non-maintained system is used mainly in the workplace or similar premises where the normal artificial lighting is illuminated at times when the premises are occupied. As soon as the supply to the normal lighting is restored, the supply to the lamp of the emergency luminaire is switched off and the battery is recharged ready for the next supply failure.



A non-maintained mode of operation is suitable for most types of premises.

(1) **Maintained emergency luminaire** is one in which the lamp of the emergency luminaire is 'on' at all material times, even when the normal or emergency lighting is required.

BS 5266 recommends a 'maintained' mode of operation for premises where the normal lighting can be dimmed or turned off below the levels required for the identification and illuminance of escape routes whilst the

premises are occupied, such as in a theatre or cinema (Clause 9.4 refers). *BS EN 50172: 2004 (BS 5266-8: 2004)* also recommends illuminated exit signs have a maintained mode of operation where the occupants are likely to be unfamiliar with the premises.

Where other types of premises are used for recreational purposes, in which the normal lighting cannot be dimmed, it is necessary only for the exit signs to have a maintained mode of operation (or be combined).

(2 or 3) **Combined emergency luminaire** is a luminaire containing two or more lamps, where at least one of the lamps is energised from the emergency lighting supply and the other(s) from the normal lighting supply. A combined emergency luminaire can be either non-maintained (2) or maintained (3).

These types of luminaire are used to provide continuous illumination at certain points of emphasis within an installation, even when the supply to the normal lighting is fully operational. For example, in the event of a fire alarm sounding in a hotel in the early hours of the morning, the use of illuminated exit signs in (and leading to) an external escape stairway would help to direct occupants to a place of safety, such as outside the building. Depending on the type and use of a building, combined emergency luminaires should be energised when the building is occupied and turned off at all other times.

Combined emergency luminaires are sometimes referred to as 'sustained luminaires', but it should be appreciated that this phrase is not defined or referred to in *BS 5266-1*.

(4 or 5) **Compound self-contained emergency luminaire** is a luminaire providing non-maintained (4) or maintained (5) emergency lighting, and also providing an emergency supply to a satellite luminaire.

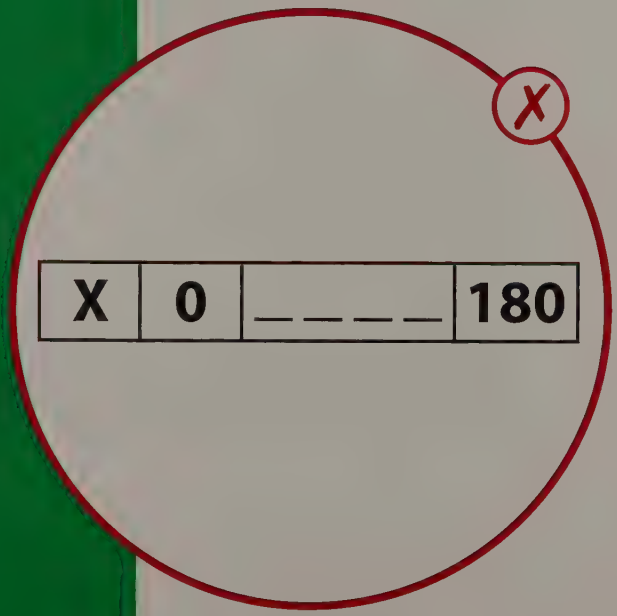
(6) **Satellite emergency luminaire** is a luminaire for maintained or non-maintained operation which derives an emergency power supply from an associated compound self-contained emergency luminaire.

Facilities

Additional devices and/or features, referred to as 'facilities' in *BS 5266-1*, can be added to or incorporated into emergency lighting luminaires.

Snag 8

Where a large number of emergency lighting luminaires are installed in a building, that have limited or no facilities (such as devices for control, isolation and/or test purposes), it can be difficult to maintain, test and/or control some or all luminaires forming part of the emergency lighting system.



Solution

The types of facility that can be added to, or incorporated into an emergency lighting luminaire are identified in Annex F(c) of *BS 5266-1*. Each facility should be identified by entering the appropriate letter, as indicated below, in the relevant section of the classification label affixed to the luminaire.

	Facility	Explanation (of feature)
A	Luminaire includes a test device	The luminaire incorporates a self-test module for testing purposes. The module can, for example, monitor battery voltage and light output, and be programmed to test the luminaire automatically at intervals for pre-set durations.
B	Luminaire includes a remote rest mode	This is a feature incorporated into self-contained emergency luminaires that enables the luminaire to be intentionally extinguished by means of a remote device when the supply to the normal lighting fails. Once the normal supply has been restored, the luminaire automatically reverts to its normal mode.
C	Luminaire includes an inhibiting mode	This is a feature incorporated into self-contained emergency luminaires that, when initiated, prevents the emergency lighting luminaire from operating. This feature should be initiated only at times when the building is unoccupied. Its purpose is to prevent the batteries within the emergency luminaire from discharging so that, if the supply to the normal lighting does fail at a time when the building is occupied, the batteries will be at full charge and ready for service.
D	High risk task area luminaire	This type of luminaire does not have a facility, so the letter 'D' is simply used to identify its purpose, which is intended to safeguard operative(s) involved in a potentially dangerous process or situation (and others using the building) when the supply to the normal lighting fails. For more information on high risk task area lighting, refer to Snag 15.

Furthermore, a letter 'E' should be inserted on the classification label to indicate that the emergency luminaire contains a non-replaceable lamp or battery. Whereas a letter 'F' should be inserted for automatic test gear (conforming to *BS EN 61347-2-7*), and a letter 'G' for an internally illuminated safety sign (Annex F of *BS 5266-1*, and *BS EN 60598-2-22:2014* refer).

Note: Information on developments in emergency lighting application and technology is contained in Annex B of *BS 5266-1*.

Duration period

Where the immediate reoccupation of a building is required, the emergency escape lighting system should have sufficient battery capacity (duration) to facilitate this.

Snag 9

Where careful consideration is not given to:

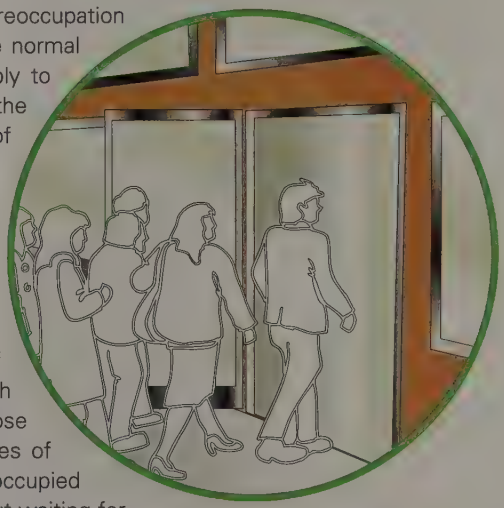
- whether an immediate or phased evacuation is required
- how long it will take to evacuate the premises, and
- whether or not there will be a need to reoccupy the premises as soon as the supply has been restored, without waiting for batteries to recharge,

occupants may not be suitably protected.

Solution

In order to provide an effective and reliable emergency lighting system, it is important for designers of such systems to consider, amongst other things, how long it will take to evacuate a building when, for example, the supply to the normal lighting fails. Consideration must also be given to when occupants will be required to evacuate the building and if there will be an immediate need to reoccupy the building once the supply has been restored.

To allow for these situations, Clause 4.2.5 of *BS EN 1838: 2013* specifies that an emergency escape lighting system must provide illumination for a minimum duration of 1 h, irrespective of how little time it would take to evacuate a building. *BS 5266-1*, however, considers the minimum duration of 1 h to be insufficient to allow immediate reoccupation of the premises once the supply to the normal lighting has been restored as the supply to the normal lighting could fail during the battery recharge period (Clause 6.7.3 of *BS 5266-1* refers).



For this reason, designers will often choose to install an emergency escape lighting system that has a minimum duration of 3 h in premises that will not be evacuated immediately in the event of a supply failure. The types of premises that should have a system with a minimum duration of 3 h include those used as sleeping accommodation, places of entertainment, and those that will be reoccupied as soon as the supply is restored without waiting for the batteries to recharge.

Note: For certain installations, such as hotels, the risk assessment may allow occupants to remain in the building on failure of the normal lighting supply. However, additional safety measures may be required (Clause 5.3 and Annex C of *BS 5266-1* refer).

Information on the period of duration recommended for particular types of premises is given in Snag 10 'Classification of system'.

Classification of system

To support designers of emergency lighting systems, *BS 5266-1* provides guidance on the systems that are suitable for typical types of premises.

Snag 10

Where the risk assessment fails to identify the range of risks associated with a particular type of premises, it may result in the designer specifying an inappropriate duration period for the emergency lighting system.

Solution

When determining a suitable classification of emergency lighting system for a particular type of premises, the designer's risk assessment must take into account all the factors that could affect the safety of the occupants, should loss of the normal lighting occur. For example, the ability of occupants to move to a place of safety in an emergency is dependent on factors, such as:

- the physical and mental condition of the occupants,
- how familiar they are with the building layout and its complexity, and
- the risks that may be present within the building at that time.

In addition, risks arising from the types of activities undertaken within the premises should also be identified along with the need to provide immediate re-occupation of the premises once the supply has been restored.

To support designers, Clause 9 of *BS 5266-1* provides guidance which is intended to illustrate a logical approach to assessing the risks for typical types of premises covered by the standard. The premises are divided in to a number of broad classes as described in Clauses 9.2 to 9.11 so that those involved in the design of emergency lighting systems can identify the methodology used and where necessary apply that reasoned approach to other types of premises.

These broad classes of premises are not exhaustive, and where any doubt exists, the local enforcing authority should be consulted to agree an appropriate classification of emergency lighting system. For premises that have multiple uses the most stringent recommendations applicable to its usage should be applied (Clause 9.8 of *BS 5266-1 refers*).

The following table shows the duration periods recommended by *BS 5266-1* for emergency escape and safety lighting for typical premises.

Note: Regulatory requirements in licensed premises, for example, may stipulate minimum duration periods for certain premises.

The broad classes of premises are summarised as follows:

Broad class of premises and minimum recommended duration (h)	Typical premises and reason(s) for recommendation
Premises used as sleeping accommodation **3**	Hotels, guest houses, boarding schools and care homes. Occupants using these premises will generally be **unfamiliar** with their surroundings, and the immediate reoccupation of the premises is usually required once the supply to the normal lighting has been restored.
Non-residential premises used for treatment or care **3**	Specialist schools and clinics. Owing to the nature of the occupants and the variations to staffing levels, a longer duration is recommended.
Non-residential premises used for recreation **3**	Theatres, cinemas and concert halls. Occupants using these premises will generally be **unfamiliar** with their surroundings, and the immediate reoccupation of the premises is usually required once the supply to the normal lighting has been restored.
Non-residential premises used for teaching, training and research, and offices **1 or 3**	Schools, colleges and institutes. Occupants using these premises are generally familiar with their surroundings as they should have received some training on fire safety. A minimum duration of 1 hour can be specified where the movement of people in an emergency situation is expected to be controlled and orderly. However, a duration of 3 hours should be specified where immediate reoccupation of the premises is required or where the premises is used outside normal working hours.

Broad class of premises and recommended Duration (h)	Typical premises and reason(s) for recommendation
Non-residential public premises **3**	Libraries, museums, shops, shopping malls, town halls and art galleries. The majority of occupants using these premises will generally be **unfamiliar** with their surroundings, and evacuation may involve large numbers of people, or smaller dispersed numbers or groups of people, to be gathered. Immediate reoccupation is usually required once the normal lighting has been restored.
Industrial premises used for manufacture, processing or storage of products **1**	Factories, warehouses, workshops and similar establishments. Occupants using these premises are expected to be reasonably familiar with the layout and fire safety procedures. The movement of occupants is also expected to be orderly.
Common access routes within blocks of flats or maisonettes **3**	Occupants using this class of premises are generally expected to be familiar with the layout — the common access routes are classified as escape routes from sleeping risk premises. For this reason, a 3 h duration is recommended.
Covered car parks **3**	The emergency lighting provision for the pedestrian routes of covered and multi-storey car parks should be of the same standard as that provided along the escape routes within 'non-residential public premises'.
Sports stadia **3**	Due to the large number of people that are likely to be gathered at sports stadia and the like, it is recommended that such venues have a duration of 3 hours.

Escape routes

Defined emergency escape routes should be provided with at least the minimum level of illumination recommended by *BS 5266-1*.

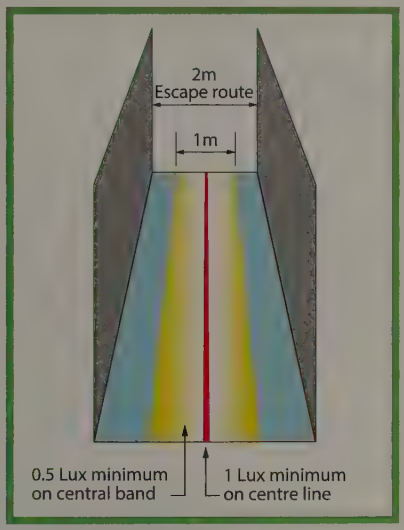
Snag 11

It is important that the level of illumination provided by the emergency lighting system in emergency escape routes meets or exceeds the minimum value specified in *BS 5266-1*; otherwise occupants may experience some difficulty moving to a place of safety in the event of an emergency.

Solution

It is often necessary to provide extra emergency lighting luminaires to those provided at points of emphasis, to ensure that the recommended minimum level of illumination is met along the whole escape route.

For escape routes up to 2 m wide, Clause 5.2.5 of *BS 5266-1* recommends that the horizontal illuminance on the floor along the centre line of an escape route should be at least 1 lux. In addition, Clause 4.2.1 of *BS EN 1838* also requires at least 1 lux to be provided along the centre line of escape routes and that the central band of the escape route (consisting of not less than half the width of the route) should be illuminated to at least 50 % of that value (as shown below). Wider routes should be treated as a number of 2 m wide strips, or open area anti-panic lighting should be provided.



In earlier editions of *BS 5266-1*, a reduced level of illumination of 0.2 lux was permitted in escape routes, provided they were kept unobstructed at all times. However, in practice, ensuring corridors and stairways (that formed part of an escape route) were clear and hazard free at all times proved difficult to manage, because items such as photocopiers, display cabinets, and seating were often located in such locations. For this reason, where such locations are found to have that reduced level of emergency lighting provision, the responsible person should be informed so that an assessment can be made to see if the existing emergency luminaires are suitable for continued use or they should be replaced with a sufficient number of luminaires to meet current recommendations (Annex L of *BS 5266-1* refers).

It should be appreciated that some occupants, such as the elderly or those with impaired vision, will take longer to perceive objects and adapt to changes of illuminance. Therefore, to assist such persons to move to a place of safety in the event of an emergency, the illuminance provided along the escape route(s) may need to be higher than the minimum value specified in *BS 5266-1* and *BS EN 1838*.

Note: For emergency safety lighting, a minimum illuminance of 1 lux is recommended (Clause 5.3.2 of *BS 5266-1* refers).

Minimum number of emergency luminaires

Illumination from at least two emergency luminares should be visible in an emergency escape route and each room (open area) that requires emergency lighting.

Snag 12

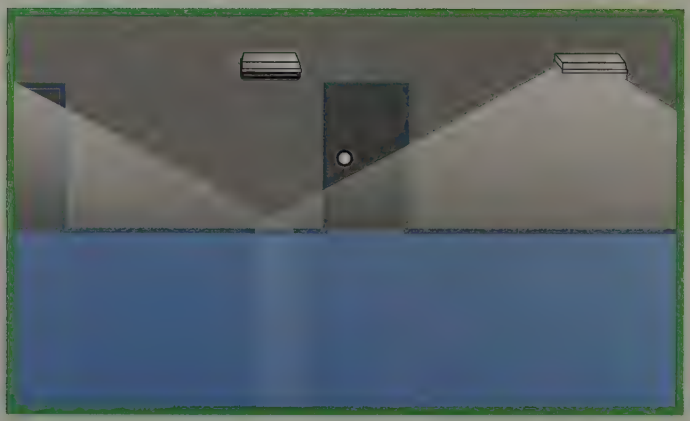
Where the emergency illumination for a section of an escape route or open area is provided by a single emergency luminaire, occupants may be left in the dark should it fail to operate when needed.

Solution

Emergency lighting should be designed and installed so that the failure of a single luminaire or an internally illuminated safety sign does not leave a particular area in darkness.

To minimise the risk, Clause 6.3 of *BS 5266-1* and Clause 5.3 of *BS EN 50172: 2004* specify that the emergency illumination is provided by at least two emergency luminaires (or emergency exit signs) in each room (open area) requiring emergency lighting and the escape route.

Verification of the illumination provided should be determined with all doors shut. However, light through glazed panels may be taken into account, if sufficient.



For information regarding the spacing of emergency luminaires refer to Snag 33.

Open areas

Open areas of premises should be sufficiently illuminated so that occupants can find their way to a place of safety in the event of an emergency.

Snag 13

Occasionally, through the process of undertaking a site risk assessment, some open areas of buildings are found to have little or no provision for emergency escape lighting.

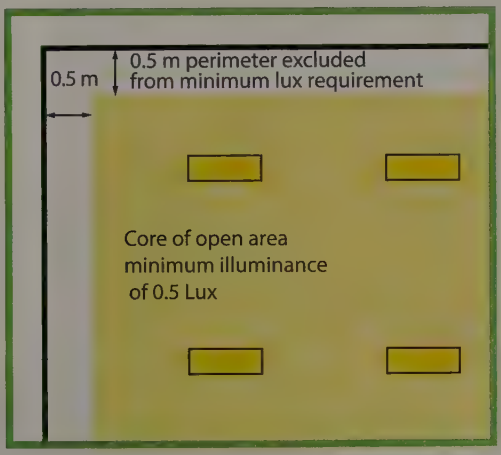
Where this is the case, occupants are at risk of being plunged into darkness when the supply to the normal lighting fails. Furthermore, should the building be unfamiliar to the occupants, some could soon become disorientated and/or panic.

Solution

The objective of open area lighting is to provide a sufficient level of illumination so that occupants can feel safe and move towards a place of safety when the supply to the normal lighting fails.

Clause 5.2.6 of *BS 5266-1: 2016* recommends that open area (anti-panic) lighting be provided for:

- rooms greater than 60 m^2 in floor area,
- areas of any size with an escape route passing through them, and
- any areas that the site risk assessment has identified as requiring emergency illumination; for example, a school laboratory where students handling acids would be at risk if they were in total darkness.



A minimum illuminance of 0.5 lux should be provided at the floor surface of open areas. However, for practical reasons, a 0.5 m strip around the perimeter of the area can be ignored as, too, can the shadowing effects of movable objects within the core area. The illuminance provided should be uniform.

Emergency lighting installations designed to an earlier edition of *BS 5266*

Prior to 1988, the recommendation to provide emergency lighting in open areas was not addressed in *BS 5266* so some designers opted not to include it in the emergency lighting system. Consequently, where open areas are found to have little or no provision of emergency lighting, when undertaking, say, a periodic inspection of the system, the installation should be reported to the responsible person. An assessment should then be made as to whether the system should be upgraded to meet the latest recommendations (Annex L (L.2) of *BS 5266-1: 2016* refers).

Siting of emergency luminaires

All points of emphasis should be adequately illuminated when the supply to the normal lighting fails.

Snag 14

Where designers fail to provide a sufficient level of illumination at all points of emphasis ('critical points'), which may not be limited to emergency escape routes, occupants may struggle to find their way to a place of safety when the supply to the normal lighting fails.

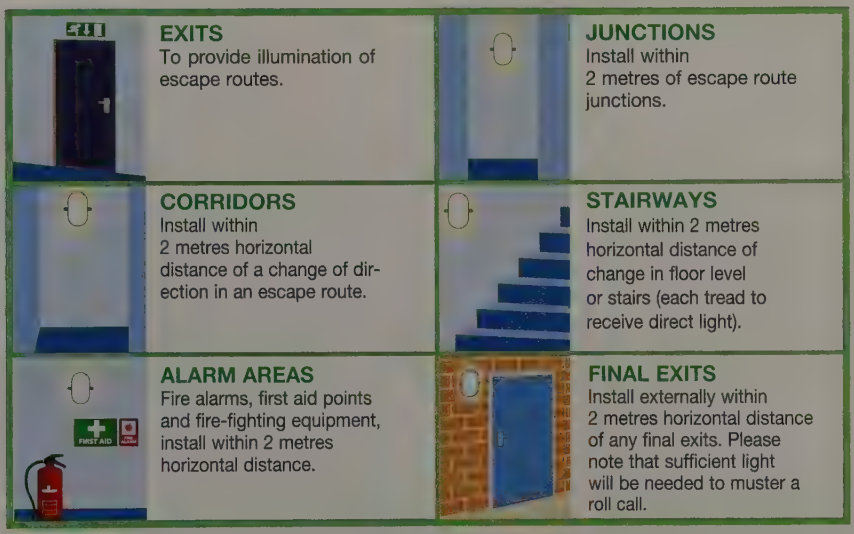
Solution

The main purpose of emergency escape lighting is to guide people to a place of safety by illuminating the way and, where appropriate, to highlight any potential hazards that would be encountered along the way. Emergency lighting is also used to increase the likelihood of fire fighting and safety equipment being found and/or used.

Therefore, where sufficient levels of illumination are **not** provided at certain locations, referred to as points of emphasis, within a building, occupants could be faced with an increased risk to their safety when the supply to the normal lighting fails. For example, wherever there are inadequate levels of illumination on stairways and/or where changes to floor levels occur along an escape route, there is a greater risk of tripping. In addition, persons can also become confused and/or disorientated, which can lead to collisions, at directional changes such as at corridor intersections.

As a result, the design of an emergency escape lighting system should identify all points of emphasis along the emergency escape route and provide sufficient illumination, as recommended by *BS 5266-1: 2016*, to allow the safe movement of occupants in an emergency.

In accordance with Clause 5.2.8.1 of *BS 5266-1: 2016* and Clause 4.1 of *BS EN 1838: 2013*, an emergency luminaire complying with *BS EN 60598-2-22* should be sited at each point of emphasis along the escape route including:



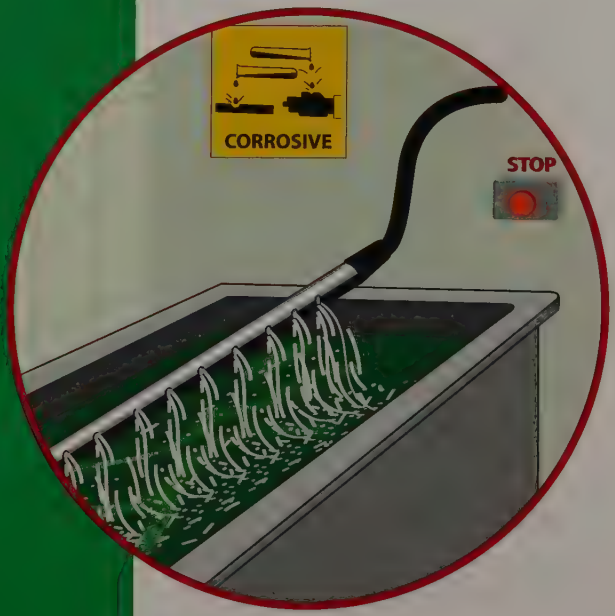
Note: For external areas in the immediate vicinity of exits refer to Clause 5.2.8.2 of *BS 5266-1:2016*.

High risk task area lighting

Greater levels of emergency illumination should be provided in areas of particular risk to occupants, to allow for the safe shut-down of a potentially dangerous process or activity.

Snag 15

Should failure of the normal lighting supply occur in a location where a potentially dangerous work activity or operation is being carried out, those involved in the activity and/or those in the vicinity could be placed in danger.



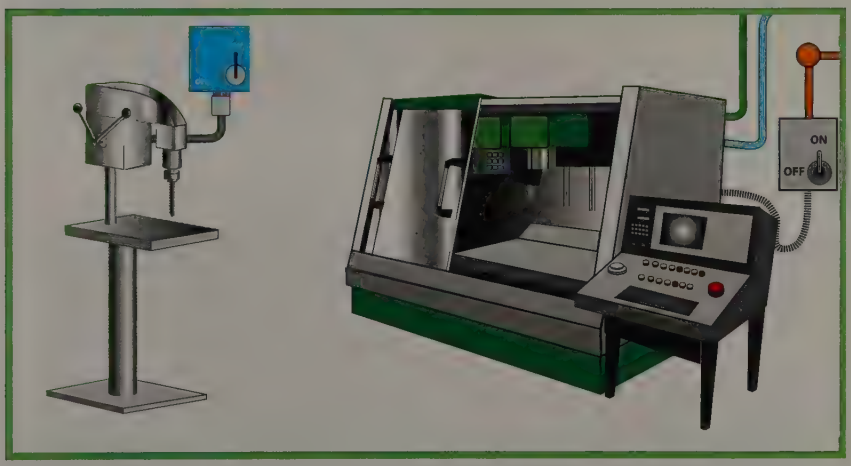
Solution

Some work activities could be potentially dangerous, should a sudden loss of lighting occur. For example, where a work task or process involves the use of rotating machinery, chemical baths, or high speed cutting equipment, the safety of operative(s), distracted by the loss of the normal lighting supply, could be at risk. For this reason, high risk task area lighting should be provided, in accordance with Clause 5.2.7 of *BS 5266-1*, to allow for the safe shut-down of potentially dangerous operations.

The emergency lighting provided must be capable of maintaining an illuminance on the reference plane (at the level/height at which the task is performed), of not less than 10 % of the normal illumination level usually demanded for the task, but not lower than 15 lux (Clause 4.4.1 of *BS EN 1838: 2013* refers).

To avoid the risk of injury and/or a fatal accident, high risk task area lighting should provide the full required illuminance permanently, or within 0.5 s of failure of the supply to the normal lighting.

The level of illumination required for the high risk task area lighting should be free from stroboscopic effects and need only apply for the time it takes to achieve safe shut down of the potentially dangerous task or hazard. After which, the standard emergency illumination levels, appropriate to the area, will apply as normal (e.g. for open areas, see Snag 13).



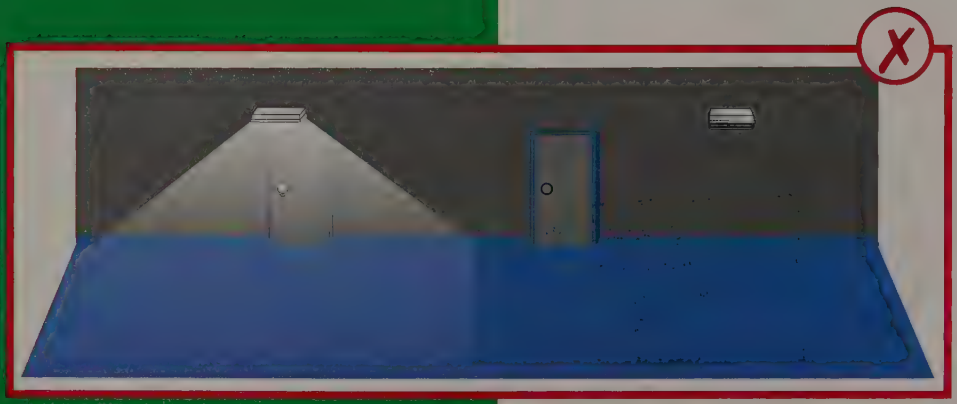
Note: For guidance on illuminance for specific locations refer to Snag 18.

Reliability of the emergency lighting system

A greater number of low light output luminaires placed closer together is preferred to a few high light output luminaires spaced further apart.

Snag 16

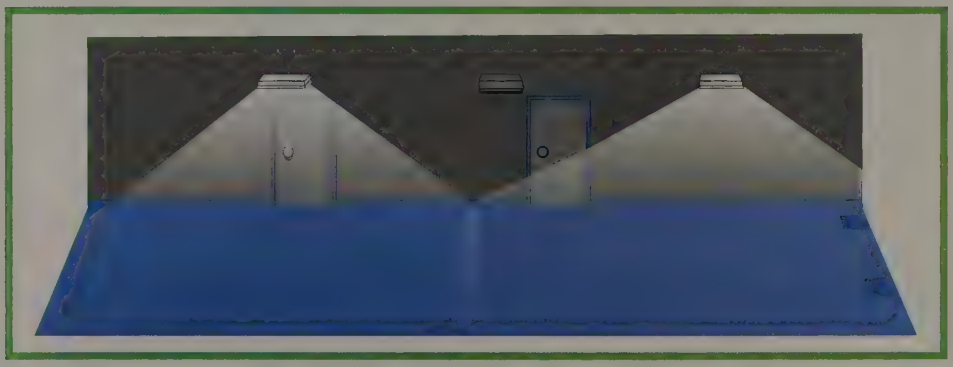
In some cases, because a small number of high light output emergency luminaires provide the required level of emergency illumination in a particular area, occupants are at risk of being left in darkness should one of the high power luminaires fail in an emergency situation.



Solution

BS 5266-1 recommends that an emergency lighting system should have a larger number of low light output luminaires placed closer together, rather than a smaller number of high light output luminaires spaced further apart.

The reason for this recommendation is to improve reliability of the system, just in case one luminaire ever fails to operate. For example, the failure of one luminaire amongst many is likely to have little effect on the overall level of illumination within that area. The failure of one high light output lamp, however, could result in the area being left in total darkness or, at best, the overall level of illumination in that area failing to meet the minimum value recommended by *BS 5266-1* (Clause 6.5 of *BS 5266-1* refers).



Additionally, a larger number of low light output luminaires closer together helps to minimise the effects of disability glare. Information on disability glare is given in Snag 34 and for information on the spacing of luminaires refer to Snag 33.

Connection to a local circuit

The electricity supply to a self-contained, non-maintained emergency luminaire should be taken from a local lighting circuit.

Snag 17

Where a self-contained, non-maintained emergency luminaire derives its supply from any circuit other than the local lighting circuit, the emergency luminaire might not operate when there is a failure of the supply to the local lighting circuit.

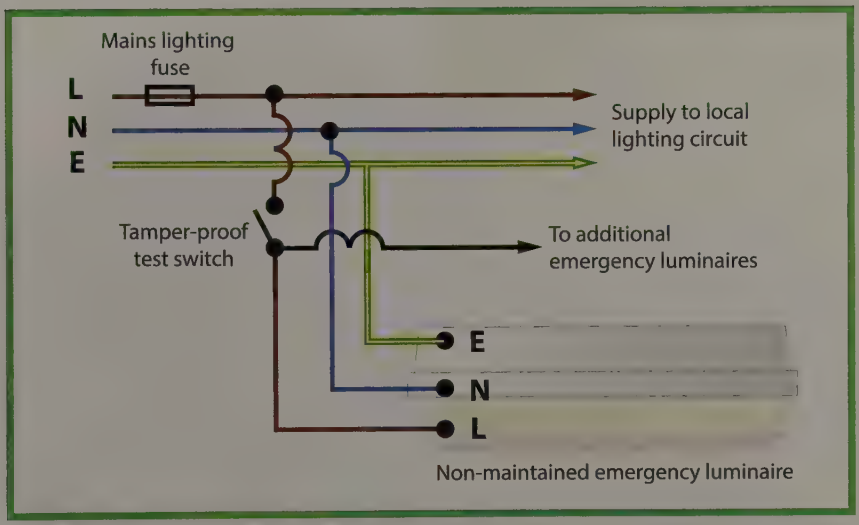
Green light indicates that the unit is charging but unit has failed to operate when the supply to the local lighting fails.

Solution

As the objective of non-maintained emergency luminaires is to provide an alternative source of lighting when the supply to the local lighting has failed, such luminaires must be capable of detecting that loss of supply (Clause 6.1 of *BS 5266-1* refers).

The simplest and most effective way for a self-contained emergency luminaire to detect a loss of supply is for it to be connected to the permanent live supply of the local lighting circuit (Clause 5.2 of *BS EN 50172* refers). This is because the control gear within an emergency luminaire monitors the incoming supply, which, when healthy, prevents the lamp from illuminating. The same control gear is also used to trickle charge the batteries in readiness for when the luminaire is required to be in operation. As soon as the incoming supply is interrupted, due to either a power cut or as a result of fire burning the lighting cables, the control gear automatically switches the supply to the luminaire from mains to batteries, and the lamp illuminates.

So, where a non-maintained luminaire is (wrongly) connected to a circuit other than the local lighting circuit, the control gear within the luminaire will not be able to detect a loss of supply to the normal lighting (unless there is a failure of the supply to the whole installation or to the distribution board supplying the power and lighting to that part of the installation that supplies the emergency luminaires).



Illuminance for specific locations

Adequate illumination should be provided to allow essential tasks to be performed or concluded safely.

Snag 18

Failure to recognise that some locations require a higher level of illumination than others when the supply to the normal lighting fails may lead to danger.

Solution

When a loss of supply to the normal lighting occurs in a location such as a kitchen or first aid or treatment room, there is often a need for a higher level of illumination to be provided than that required for escape routes as it allows for normal activities to be performed or, in some cases, be terminated.

Annex E of *BS 5266-1* provides some example locations that do require higher light levels. The examples should not be regarded as exhaustive, and do not cover any location that requires emergency safety lighting or high risk task area illumination.

Although the number of locations in Annex E is limited, the information provided for each location is intended to be helpful for other similar locations.

Some of the more common locations, together with the methodology for providing higher light levels, are shown in the following table:

Location	Minimum illuminance lux	Methodology
Kitchens	15	The illumination should be provided on the horizontal of the working plane, and any switches and cut-outs that are readily visible must be sufficient to allow equipment to be safely isolated before exiting the location in an emergency. Such equipment should be left in a way that will not cause danger whilst the building is evacuated, or would cause danger once the supply has been reinstated. Hot food is also prepared and/or carried in a kitchen, so sufficient illuminance must be provided so that individuals can leave equipment in a safe condition.
First aid rooms	15	The illumination provided on the horizontal of the working plane must be suitable to allow a simple medical procedure to be completed, such as applying a bandage to a wound.
Examination and treatment rooms	50	The illumination provided on the horizontal of the working plane must be sufficient to enable a complex procedure to be completed, such as a minor operation.
Reception areas	15	The illumination provided in the plane of the visual activity must be sufficient to allow someone to make a telephone call to the emergency services and/or read the fire alarm display accurately.

For further examples of where higher levels of illumination are required, together with response and minimum duration times, refer to Annex E (Table E.1) of *BS 5266-1*.

Lift cars, moving stairways and walkways

Lift cars, moving stairways and walkways should be illuminated as if they were part of an escape route.

Snag 19

Failure to provide emergency lighting for fixed equipment intended for the purpose of carrying persons (such as lift cars, escalators and moving walkways) may cause persons to panic on loss of the normal lighting supply.

Solution

Although lift cars, moving stairways and walkways do not normally form part of the defined emergency escape route, designers of emergency lighting systems should take account of the increased risk to those who travel in (or on) such equipment when the supply to the normal lighting fails.

For example, the experience of being in a lift without some light for an indefinite period would be not only unpleasant, it could cause harm to those who are nervous or suffer from claustrophobia. Without an appropriate level of illumination in place, users of moving stairways and walkways would be at risk of a trip or collision when having to negotiate their way off crowded equipment in the dark.

ESCALATORS
Should not be used as an escape route, but require the same illumination to protect users on it when the supply fails.

To reduce these risks to users of such equipment, Clause 5.4.2 of *BS EN 50172: 2004* recommends that the same level of emergency illumination be provided in lifts in which people travel as that recommended for open areas. In addition, Clause 5.2.8.4 of *BS 5266-1* recommends that the location of a moving stairway or walkway should have the same level of emergency illumination as that recommended for the designated emergency escape routes of the premises.

Note: For evacuation lift cars, emergency illuminance should be provided in accordance with *BS EN 81-20*. Guidance on the use of lifts for use as ameans of escape is contained in *BS 9999: 2008 Code of practice for fire safety in the design, management and use of buildings* (Clause 5.2.8.3 of *BS 5266-1* refers).

Emergency lighting in toilets

Emergency lighting is required in some toilet facilities.

Snag 20

Where emergency lighting is not provided in specific types of multiple closet toilet facilities and those for use by disabled persons, occupants could be at risk of injury from a slip, trip or fall when the supply to the normal lighting fails.

Solution

In order to comply with Clause 5.2.8.5 of *BS 5266-1*, at least one emergency luminaire should be provided in a toilet facility made available for disabled persons, and/or any multiple closet toilet facility that does not have borrowed light.

In many toilet facilities, the provision of one emergency lighting luminaire is sufficient. However, should that luminaire fail to operate (such as in the event of a power cut), users of that facility could be at risk of injury from, say, a slip or trip. Consideration should therefore be given to providing two or more emergency luminaires, to enhance the reliability of the emergency lighting system.

Furthermore, all toilet facilities exceeding 8 m^2 gross area should be treated as open areas, and emergency lighting provided to suit. (Information on open areas is given in Snag 13.)

The following table summarises the recommendations of *BS 5266-1* for the provision of emergency lighting in toilet facilities.

Type of facility	Recommendation for emergency lighting
Facilities for use by disabled persons	YES
Multiple closet toilet facilities (without borrowed light)	YES
All toilet facilities exceeding 8 m^2 gross area (with or without borrowed light)	YES
Multiple closet toilet facilities up to 8 m^2 (with borrowed light)	NO
A single closet toilet for the able-bodied	NO
An en-suite toilet or bathroom in a dwelling	NO
An en-suite toilet or bathroom in hotel bedrooms	NO

It should be appreciated that the provision of emergency lighting is not necessary in a toilet facility designed to accommodate a single able-bodied person, or in an en-suite toilet or bathroom of a hotel bedroom, as it is expected that a person using such a facility should be able to leave such a location without aid.

Response times

When a loss of supply to the normal lighting occurs, any provision of emergency lighting must come into operation promptly, to prevent confusion and panic arising.

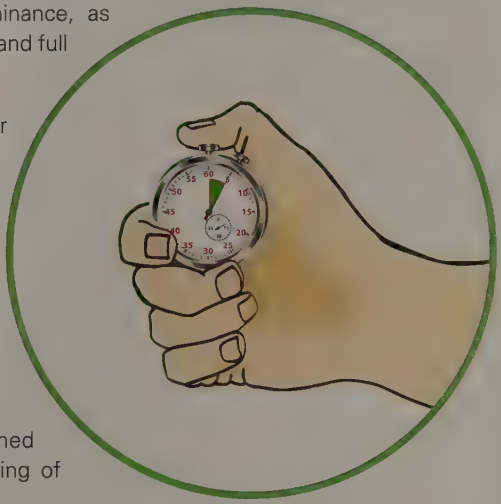
Snag 21

If the period of time between failure of the normal lighting and the switch-on of the emergency lighting system is too long, the safety of occupants might be at risk.

Solution

Research shows that when the supply to the normal lighting fails, the time it takes for people to become disorientated or panicked depends on several factors. The factors include the physical and mental condition of the occupants and their ability to adapt to the loss of artificial lighting, and whether they know the building and its layout (Clause 5.2 of *BS 5266-1* refers).

For these reasons, where the loss of supply to the normal lighting occurs, Clauses 4.2.6 and 4.3.6 of *BS EN 1838* require emergency escape routes and the open areas of premises, respectively, to be illuminated to at least half of the required emergency illuminance, as recommended in *BS 5266-1*, within 5 s and full illuminance within 60 s.



For minimum levels of illuminance refer to Snag 11.

High risk task lighting should provide the full required illuminance permanently, or within 0.5 s of failure of the supply to the normal lighting, depending on the application. For more detailed information on high risk task area lighting, refer to Snag 15.

Response times should be confirmed during the regular inspection and testing of the emergency system.

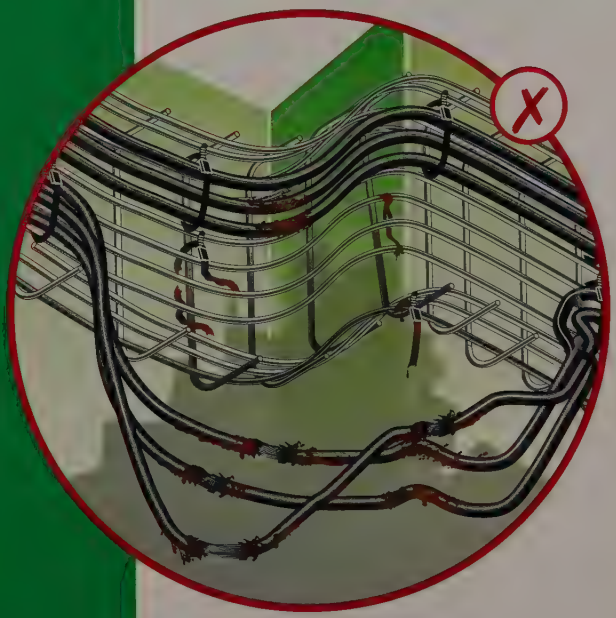
Note: Response times for specific locations are given in Table E.1 of Appendix E, of *BS 5266-1: 2016*.

Use of combustible supports and fixings (such as plastic clips or ties)

The cables of an emergency escape lighting system should not be supported or fixed solely by combustible products (such as plastic clips).

Snag 22

Where combustible products (such as plastic clips, ties, conduit or trunking) are used as the sole means of support for, or fixing of, cables that connect emergency luminaires to a central power supply, there is an increased risk of such supports failing in the conditions of fire.

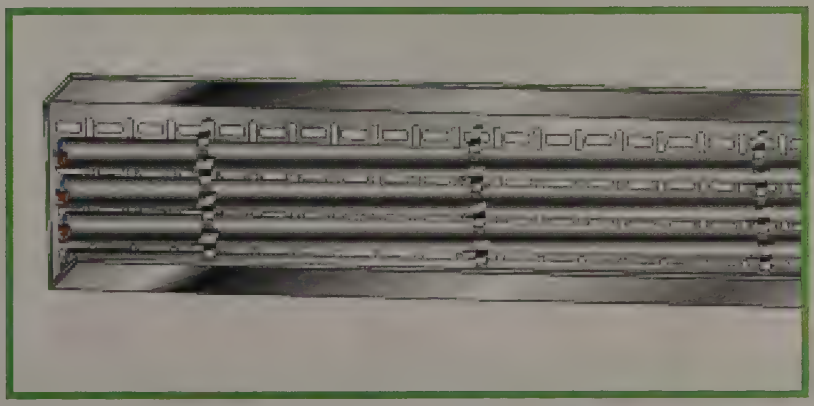


Solution

To minimise the risk of cable supports and/or fixings failing in the event of a fire, Clause 8.2.3 of *BS 5266-1* recommends that any cable (and/or cable system) used to connect an emergency luminaire to a central power supply should be supported by an adequate number of non-combustible supports and/or fixings.

Copper and steel are good examples of materials that could be used to provide such support and/or fixings but, whatever arrangement is used, the supports and/or fixings should be able to withstand a similar temperature, duration and water application to that of the cables, and be installed in accordance with the manufacturer's recommendations.

It should be appreciated that any collapsed cable, even one of a wiring system that is not associated with the emergency lighting system, could be a serious risk to life. For example, firefighters have found themselves entangled amongst collapsed cables hanging across doorways when entering and moving about a building. Consequently, requirements for preventing the premature collapse of wiring systems in escape routes, have been included in *BS 7671* (Regulation 521.11.201 refers).



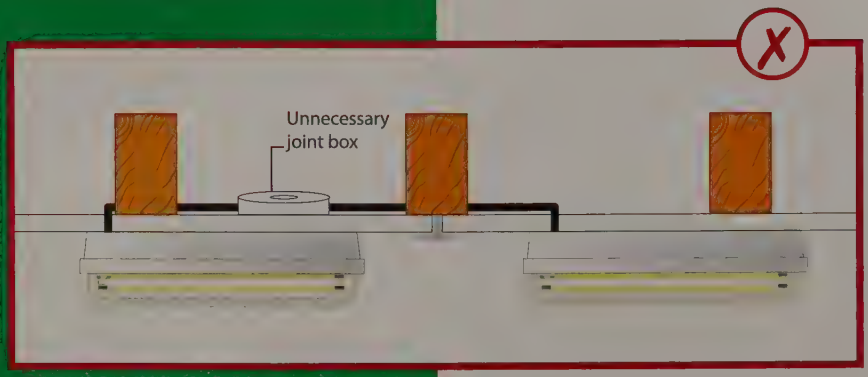
Note: Drop rods used to support cable systems should be sized in accordance with *BS 8519* (Clause 8.2.3 of *BS 5266-1* refers).

Joints

A joint in a cable of a centrally supplied system should, wherever possible, be inside the component parts of the emergency lighting system.

Snag 23

Wherever a joint in a cable of an emergency lighting system is located outside the component parts of the system (the emergency luminaires and any associated control devices), there is an increased risk of failure of the system at, and from, that point.

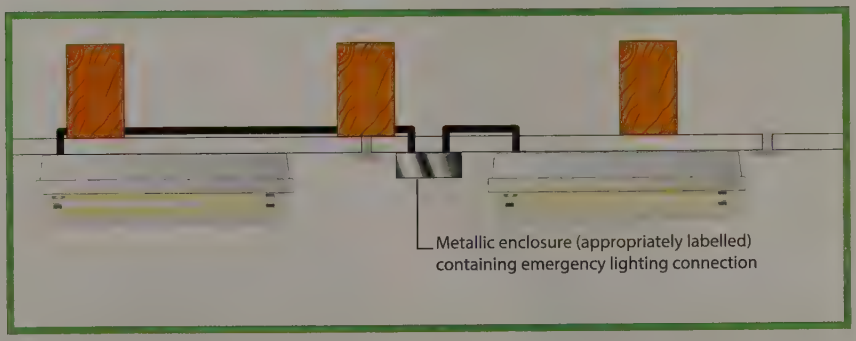


Solution

Occasionally, a cable of a centrally supplied emergency lighting system can become damaged due to (say) maintenance work being carried out on services and/or other equipment above or close to the cable. Where such damage occurs, a joint (for the purposes of repairing the cable) should be made only if rewiring of that part of the circuit is not practicable.

Where a joint in a cable is unavoidable, Clause 8.2.4 of *BS 5266-1* recommends that the joint is located in an area of low fire risk, as identified by the fire safety risk assessment, and has all of the following characteristics:

- The cable joint is insulated using a material that is capable of withstanding the same temperature, water application and mechanical shock as that of the cable.
- The enclosure used to contain the connection should provide the same temperature rating, water application and mechanical shock as that of the cable and should also be appropriately labelled to avoid any confusion with other services. (For information on labelling, refer to Snag 30.)



An example of a suitable type of joint is a component comprising metal terminals insulated by ceramic material and mounted in a metallic enclosure. The use of plastic connector blocks and enclosures is not generally considered suitable.

To facilitate fault finding and periodic inspection and testing of the emergency lighting system, the location of all joints located outside the component parts of the emergency lighting system should be clearly recorded on the appropriate system drawings.

Segregation

The wiring of a centrally supplied emergency lighting system should be exclusive to that system and separate (either by distance or suitable barrier) from the wiring of any other circuits.

Snag 24

Where the cables connecting emergency luminaires to a central power supply are installed in the same containment system with other circuits they are at risk of mechanical damage, which could reduce the integrity of the emergency lighting system.

Solution

Where the cables of an emergency escape lighting system are installed in a common containment system (such as trunking, ducting, cable basket or cable tray) with cables of other services, there is an increased risk that the emergency lighting cables could suffer damage from:

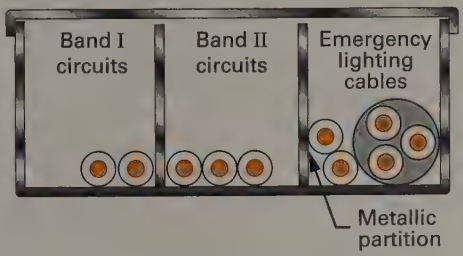
- the drawing in or removal of other cables
- interference due to work being carried out on other circuits
- a fault on another circuit, resulting in a breakdown or bridging of the electrical insulation, causing damage to the cables of the emergency lighting system.

In order to minimise the risk of such damage, Clause 8.2.6 of *BS 5266-1* recommends that the cables of a centrally supplied emergency escape lighting system should be segregated from other circuits (including those of other safety circuits such as fire alarm cables).

One method of achieving segregation is to install the cables of the emergency lighting system in a separate conduit, trunking or ducting, although such an arrangement is not always practicable.

Where the cables of an emergency lighting system are installed within a containment system with other circuits, the emergency lighting cables will need to be segregated from the other circuits by a partition that:

- is made from the same material as the containment system (e.g. metal);
- is permanently and securely fixed to the containment (e.g. riveted or bolted);
- has adequate strength and rigidity;
- is continuous throughout the whole length of the emergency lighting cable installation within the common containment system;
- is not perforated and has the same height as the sides of the common containment system.



Where it is not practicable to separate emergency lighting cables from other circuits, including those of other safety circuits, by means of barriers or distance, Regulation 560.7.7 of *BS 7671* implies that metallic screened, fire resistant cables may be used for the emergency lighting system as a means of achieving segregation from the other circuits.

A multicore cable may be used in the emergency lighting system, but none of the cores should be used for any other circuit. (Clause 8.2.6 of *BS 5266-1* refers.)

Note: The segregation requirements described here are not applicable to circuits serving self-contained emergency luminaires, because they are not considered by *BS 5266-1* to be part of the emergency lighting installation. However, circuits serving self-contained luminaires should comply with the segregation requirements of *BS 7671*.

Types of cable and cable systems

The cables or cable system used to connect emergency luminaires to a central power supply must adequately resist the effects of fire and mechanical damage.

Snag 25

Where a cable that is not inherently resistant to the effects of fire, such as PVC insulated and sheathed 'twin and earth' cable is used to connect the central battery to the emergency luminaires, it is likely to fail prematurely in the conditions of fire.

Solution

BS 5266-1 specifies particular types of wiring system that should be used for the connection of emergency escape lighting luminaires to a central power supply (battery unit). The reason for this is so that the wiring system will adequately resist the effects of fire and mechanical damage.

The specified types of wiring system are classified into two main groups, the first being 'cables' and the second being 'cable systems' (which means cables in screwed steel conduit).

An enhanced cable or cable system is likely to be specified where an increased level of fire survival is deemed necessary, subject to a fire risk assessment being carried out. Example applications of where an enhanced cable or cable system might be needed include:

- unsprinklered buildings (or parts of) in which the evacuation is phased over four or more stages
- unsprinklered buildings greater than 30 m high
- unsprinklered premises or sites where a fire in one area could affect cables associated with areas remote from the fire, and it is envisaged that people will remain in occupation during the fire.

Table 1 summarises the recommendations of Clause 8.2.2 of *BS 5266-1* for the selection of wiring systems for the connection of emergency escape lighting luminaires to a central power supply.

Note: Cables and cable systems should be routed through areas of low fire risk wherever possible (Clause 8.2.1 refers).

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Table 1: Cables and cable systems in *BS 5266-1* for the connection of emergency lighting luminaires to a central power supply

Cables

- Cables with an inherently high resistance to attack by fire

- Mineral insulated cable to *BS EN 60702-1: 2002* with terminations conforming to *BS EN 60702-2: 2002*, or
- Multicore fire-resistant screened cables having low emission of smoke and corrosive gases when affected by fire, conforming to *BS 7629-1*, or
- Thermosetting insulated, armoured, fire-resistant cables having low emission of smoke and corrosive gases when affected by fire, to *BS 7846*.

All with:

60 minutes duration of survival when tested in accordance with *BS EN 50200: 2015*, Annex D, and

30 minutes when tested in accordance with *BS EN 50200: 2015* Annex E.

- Enhanced cables with an inherently high resistance to attack by fire

- Mineral insulated cable to *BS EN 60702-1: 2002* with terminations to *BS EN 60702-2: 2002*, or
- Multicore fire-resistant screened cables having low emission of smoke and corrosive gases when affected by fire, conforming to *BS 7629-1*, or
- Thermosetting insulated, armoured, fire-resistant cables having low emission of smoke and corrosive gases when affected by fire, to *BS 7846*.

All with:

120 minutes duration of survival when tested in accordance with *BS EN 50200: 2015*, Annex D, and

120 minutes when tested in accordance with *BS 8434-2*.

Cable systems

- Cable systems with an inherently high resistance to attack by fire

Fire-resistant single-core or multicore cables enclosed in screwed steel conduit.

Such that:

60 minutes duration of survival is given by the cable system. The cable should meet the requirements of IEC 60331-3 for a flame application time of 60 minutes.

- Enhanced cable systems with an inherently high resistance to attack by fire

Fire-resistant single-core or multicore cables enclosed in screwed steel conduit.

Such that:

120 minutes duration of survival is given by the cable system. The cable should meet the requirements of IEC 60331-3 for a flame application time of 120 minutes.

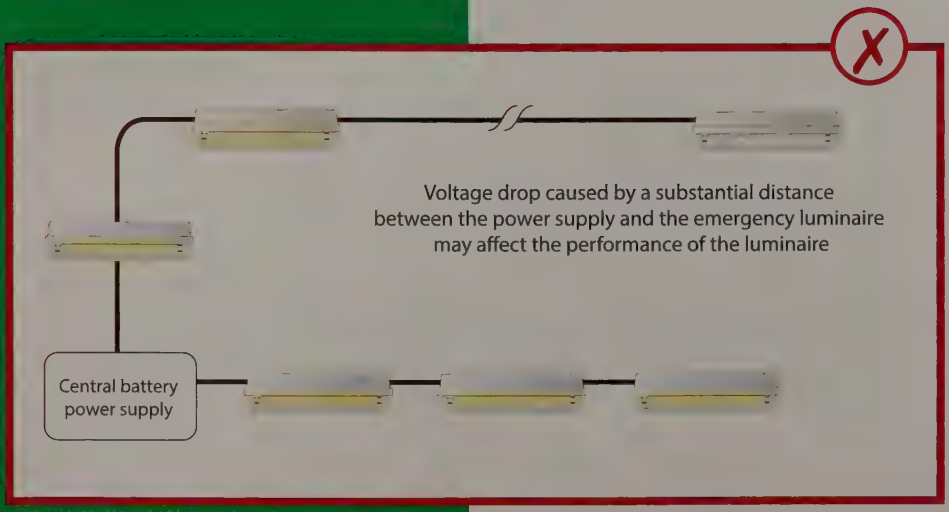
Note: Clause 8.1 of *BS 5266-1* recommends that the supplies to self-contained emergency luminaires should not be wired in fire-protected cable, but should be installed to the same standard as the supplies to normal luminaires.

Voltage drop

In order to maintain expected illuminance from slave emergency lighting luminaires, it is essential to limit the voltage drop in the conductors supplying such luminaires.

Snag 26

Where luminaires forming part of a centrally supplied emergency lighting system are positioned at a substantial distance from the central supply, excessive volt drop can occur.

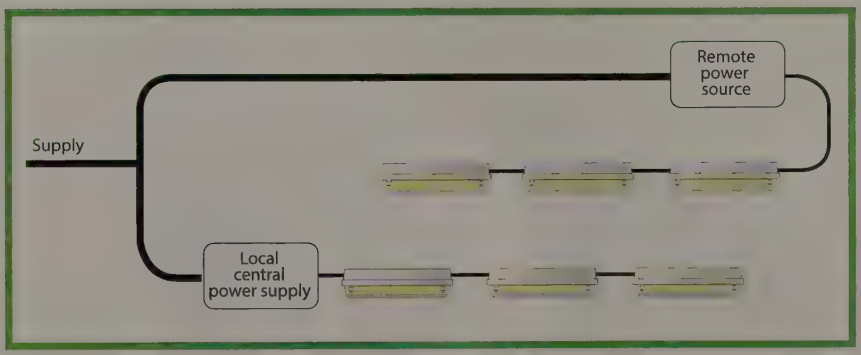


Solution

As the performance and functionality of a slave emergency lighting luminaire can be severely reduced by undervoltage, Clause 8.2.7 of *BS 5266-1* recommends that, when selecting a cable to connect the luminaires to a central power supply (or generator), due regard must be given to limiting the maximum voltage drop in a cable to not more than 4 % of the system nominal voltage (based on the conductors' maximum rated current and highest expected working ambient temperature). In any event, each conductor should be of copper and have a nominal cross-sectional area of not less than 1.5 mm^2.

Where voltage drop is likely to be an issue, such as where the emergency luminaires are positioned at a substantial distance from the central power supply, consideration should be given to the use of one or more localised standby central power supplies, positioned suitably close to the luminaires, rather than relying on one main central supply.

When selecting a slave emergency luminaire, it must be compatible with the central power supply to which it is to be connected. Each luminaire will therefore need to be compatible with the a.c. or d.c. voltage, as applicable, and with the input voltage range, allowing for voltage drop in the cable(s) and the end of duration battery voltage (Clause 8.3.5 of *BS 5266-1* refers).



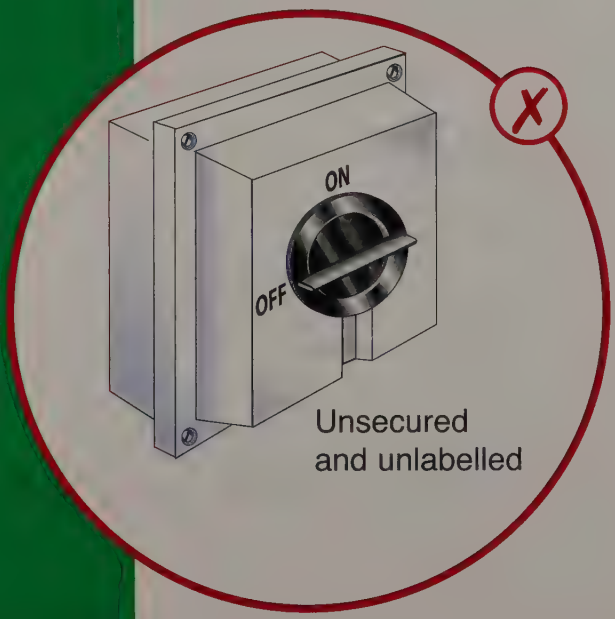
Note: Where manufacturers' spacing tables have been applied in the design of an emergency lighting scheme, that data may no longer be reliable, should excessive voltage drop exist in the cables that connect the luminaires to the central supply.

Isolators, switches and protective devices

Devices used to control or isolate an emergency lighting system should be protected against inadvertent operation.

Snag 27

Where an isolator, switch or protective device of a centrally supplied emergency lighting system is accessible and unsecured there is a risk that the device could be inadvertently operated. The outcome of this might cause a prolonged interruption of the normal supply, which could lead to a premature failure of the emergency standby power source.



Solution

In order to minimise the risk of an emergency lighting supply being inadvertently switched off, Clause 8.3.2 of *BS 5266-1* recommends that control devices such as isolators, switches and protective devices associated with the emergency lighting installation are:

- kept to a minimum, and
- located in a position such that they are accessible by authorised personnel only or have protection against unauthorised operation, and
- individually marked to identify their use (such as 'EMERGENCY LIGHTING', 'EMERGENCY ESCAPE LIGHTING' or 'STANDBY LIGHTING').

Furthermore, Clause 8.3.1 of *BS 5266-1* recommends that the normal supply to the emergency lighting system should be designed and arranged so that its continuity is assured. (Refer to Snag 28 for further information.)

Continuity of supply to be assured

The electricity supply (or supplies) to the emergency lighting system should be arranged such that continuity is assured.

Snag 28

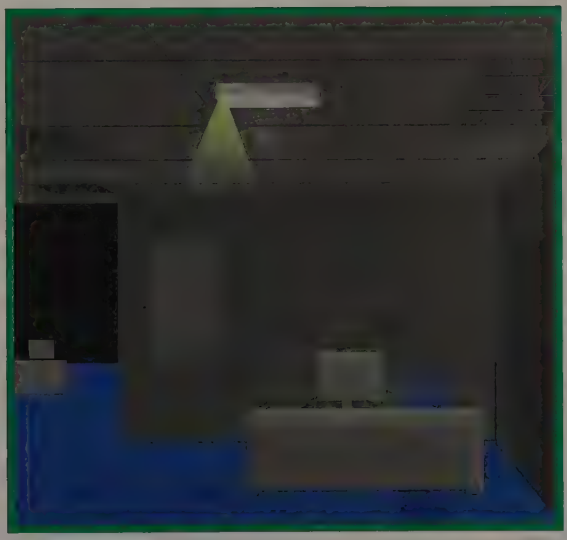
Where circuits serving a building, or a particular part of it, are regularly disconnected from the electricity supply, to (say) conserve energy at times of inoccupation, any control device(s) used to facilitate such a disconnection must not interrupt the supply (or supplies) to the emergency lighting system at the same time.

Solution

Whatever arrangement is used to control the supply to the normal lighting, either manually or automatically, Clause 8.3.1 of *BS 5266-1* indicates that the supply to the emergency lighting system should be designed and arranged such that its continuity is assured.

So, where it is common practice to switch off some or all circuits of a building, to (say) conserve energy overnight and/or at weekends, or at specific times when particular locations are unoccupied, the electrical installation should be designed so that it is not possible to interrupt the supply to the emergency lighting system at the same time. For example, where a contactor (or similar device) is used to control one or more supplies to lighting circuits, it must be confirmed that the operation of such a device does not also disconnect the supply to the emergency luminaires.

For further information on devices to control and/or isolate an emergency lighting system, refer to Snag 27.



Note: Annex B of *BS 5266-1* contains guidance on developments in emergency lighting application and technology.

Use of conduit, ducting, trunking and channel

Some forms of conduit, ducting, trunking and channel can be used to provide additional ('extra') mechanical protection for emergency lighting cables.

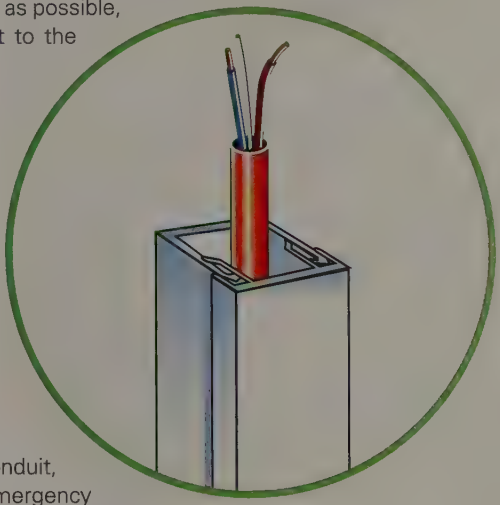
Snag 29

Sometimes, the integrity of an emergency lighting installation is compromised because cables, such as 'soft-skinned' fire-resisting cables, are not adequately protected against impact.

Solution

As a cable complying with *BS 7629-1* is recognised in *BS 5266-1* as having an inherently high resistance to attack by fire, it is one of the few types of cable that may be used to connect emergency luminaires to a central battery.

However, this type of cable can be particularly vulnerable to damage from, for example, impact and/or abrasion. Therefore, installation designers should try, in the first instance, to locate such cables away from any external influences that could otherwise adversely affect the integrity of the cable. This can be achieved, for example, by fixing the cable as far up a wall as possible, or, where installed in a roof void, fixing it to the underside of the roof structure.



Where it is impracticable to locate a cable in such a position, the installation designer should consider, and where necessary provide extra protection against, all external influences likely to be encountered. One way of providing the necessary mechanical protection for a cable complying with *BS 7629-1* is to run it in conduit, ducting, trunking or channel.

BS 5266-1 permits the material of the conduit, ducting, trunking or channel used in the emergency lighting installation to be either metallic or non-metallic, as long as it has the necessary strength to resist the external influences likely to be encountered at its location. As referred to in Clause 8.2.11 of *BS 5266-1* examples of potential damage include, but are not limited to:

- impact from (say) a forklift truck, hand cart or trolley
- damage from people dropping heavy or sharp objects, and
- damage from a falling ladder or other plant that would be used to carry out maintenance.

Where cables are installed in either metallic or rigid PVC conduit, the conduit must comply with the relevant parts of *BS EN 61386, Conduit systems for cable management.*

Note: Cables and containment such as trunking and conduit should be protected against premature collapse (Snag 22 refers).

Warning labels and notices

Warning notices and/or labels should be provided to indicate particular types of electrical equipment associated with an emergency lighting system.

Snag 30

Failing to fit a legible warning notice or label on particular items of equipment associated with an emergency lighting system could put operatives lives at risk when (for example) undertaking maintenance work on all, or part, of the system.

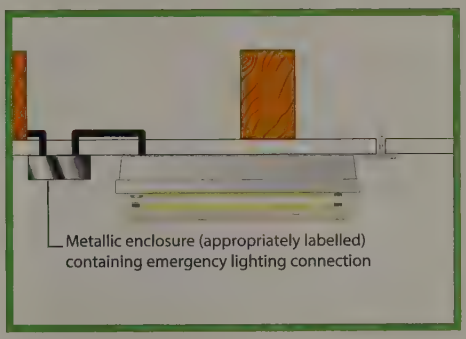
Solution

BS 5266-1 recommends that warning labels and/or notices are provided to identify, amongst other things, the purpose of isolators, switches and protective devices associated with an emergency lighting system.

All notices and labels should be of a durable material so that the wording will remain easily legible throughout the lifetime of the installation, taking into account any external influences (such as heat, vibration, water, pollution or corrosive substances) likely to be expected.

A warning label or notice is necessary at:

i) **All joints in emergency lighting cables** – the enclosure of such a joint should be labelled externally 'EMERGENCY LIGHTING', 'EMERGENCY ESCAPE LIGHTING', or 'STANDBY LIGHTING', as appropriate, to avoid confusion with other services. The words 'MAY BE LIVE' should also be added, to strengthen the warning. (Further information on joints in emergency lighting cables is given in Snag 23.)



ii) **Isolation devices** – these warning labels should be provided in such a position so that they can be easily seen and read, stating that switching off the normal supply to an emergency lighting system might make it unsafe for maintenance purposes. This is because the non-illumination of a lamp, for example, does not always indicate that a circuit is dead, and a circuit that is still live could present a hazard to maintenance personnel. For this reason, a test for voltage should always be made before accessing and/or working on the emergency lighting system.

iii) **On each luminaire** – to identify the type, mode of operation, any facility it may have, and for a self-contained system, the duration of emergency mode (in minutes).

iv) **Entrance to a battery room** – to warn all those passing that point that naked flames (and lit cigarettes) must be extinguished before entering the location.

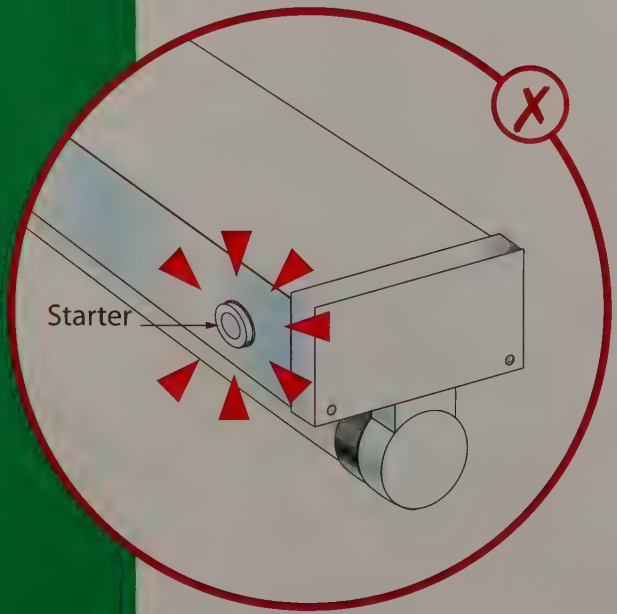
(The recommendations given in indent i) and ii) are given in Clause 8.2.4 and 8.3.4 of *BS 5266-1*.)

A suitable type of emergency luminaire

A luminaire that provides illumination in an emergency situation must be specifically designed and constructed for that purpose.

Snag 31

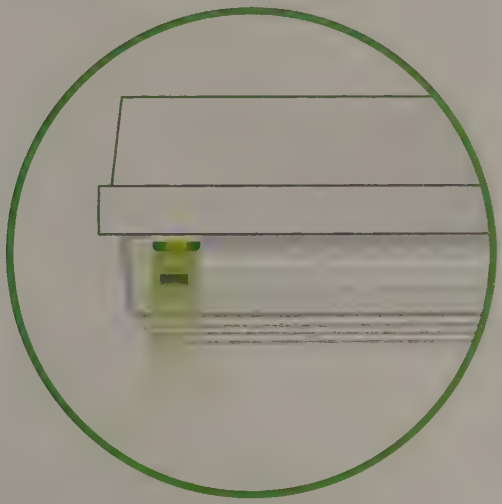
Any emergency luminaire that does not comply with the relevant requirements of *BS EN 60598-2-22* might fail to operate (or might fail prematurely) when required to do so.



Solution

To minimise the risk of an emergency luminaire failing to operate satisfactorily in an emergency condition, Clause 5.5.1 of *BS EN 50172: 2004* specifies that such a luminaire should be designed and constructed in accordance with *BS 60598-2-22: 2014*, the product standard that specifies the particular requirements for emergency lighting luminaires for use with electrical light sources on emergency power supplies not exceeding 1000 V (Clause 7.4 of *BS 5266-1* refers).

In order for an emergency luminaire to comply with *BS EN 60598-2-22*, a number of requirements have to be met. Here are some of the more significant ones:



- The means of charging the battery of a self-contained luminaire may be an integral part or be sited such that the connecting cable does not exceed 1 m in length.
- Each self-contained emergency luminaire should include an indicator (coloured green or red) that is visible in normal use, to show that the battery is being charged and, where a tungsten lamp is used, circuit continuity exists across the filament.
- Any part or component that could move or come into contact with either the battery, the leads from the charger to the battery, or the charger circuit, within the luminaire, must be of a material that can withstand a glow wire test at a temperature of 850 °C.
- The failure of an emergency luminaire must not affect the operation of other luminaires connected to the same circuit. This requirement can be satisfied by, for example, means of a fuse, relay or other protective device incorporated into each luminaire.

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- Any fluorescent lamps within an emergency luminaire used to provide emergency lighting should not be started by glow-type starters.
- Each luminaire must be clearly marked with the details of the correct replacement lamp to be used. Any marking used should be in a visible position during lamp replacement, to ensure the rated emergency lumen output will be achieved.

Each luminaire must be clearly marked with details of correct battery replacement, identifying battery type and rated voltage.

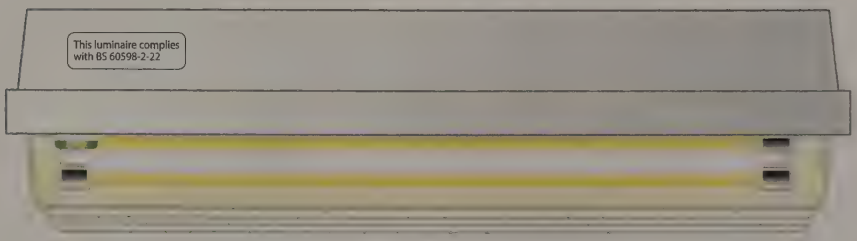
Ni-Cd battery pack

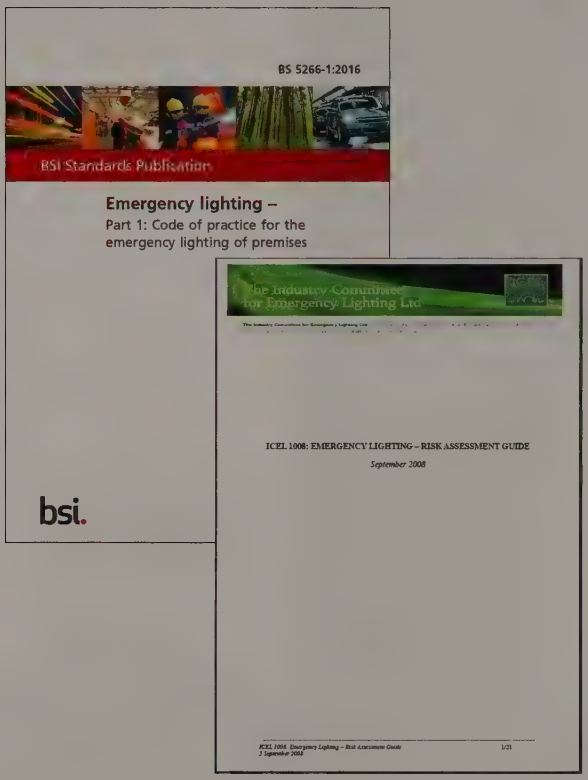
Charge before operation
Do not reverse polarity

Model	Ah	D.C.(V)	Hrs	Date
BA2-1703	1.7	3.4	3	15.04.2012

Commissioning date: _____

Where a luminaire is not compliant with *BS 60598-2-22*, there is no confirmation that its performance can be relied on in an emergency situation.





Note: The Industry Committee for Emergency Lighting (ICEL) provides third party verification for emergency luminaires. ICEL tests luminaires for safety and performance and also provides photometric verification.

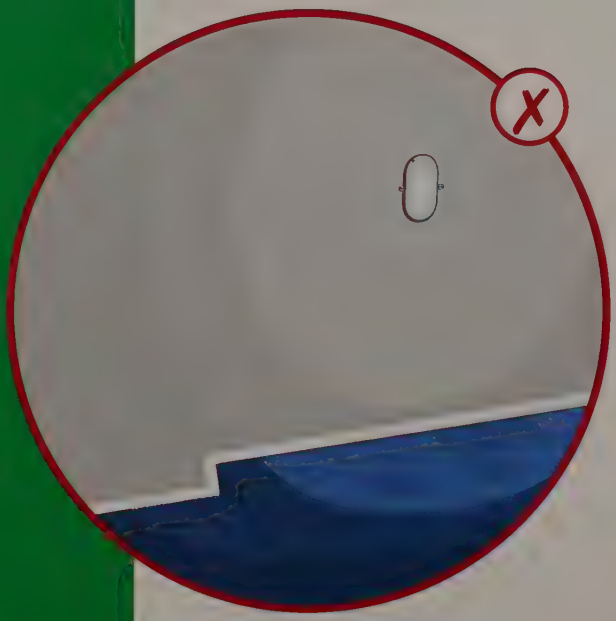
For more information on ICEL, visit www.icel.co.uk

Mounting height of luminaires

An emergency lighting luminaire should normally be mounted at least 2 m above the floor, but a different height may be more appropriate to a particular application following risk-assessment.

Snag 32

It is important to recognise that an emergency lighting luminaire mounted on a wall might not provide an even illuminance along the horizontal centreline of the floor (especially in an escape route) or, depending on the application of the luminaire, highlight a specific hazard.

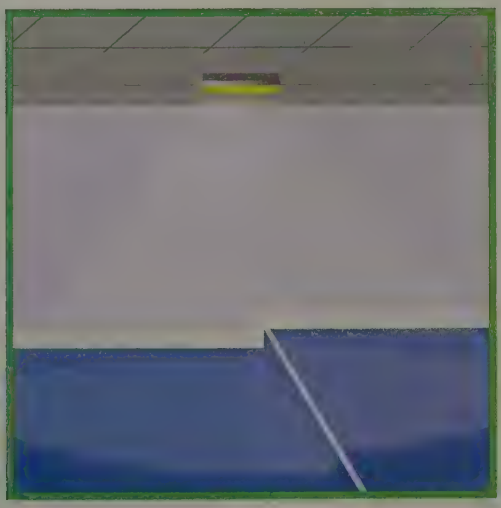


Solution

Clause 6.4 of *BS 5266-1* recommends that the normal mounting height of an emergency luminaire should be at least 2 m above the floor. However, subject to a risk-assessment, the normal mounting height may need adjusting to suit a particular application.

For example, a mounting height of less than 2 m may apply in older buildings that have low ceilings or where there is a need to be below a smoke reservoir of a shopping centre or large open-plan office (as smoke is intended to flow into such an area). There may also be a need to highlight a particular hazard at low level, such as at a change in floor level.

A mounting height of more than 2 m might be appropriate where projector or high output type luminaires are used, as these luminaires can produce intense narrow beams of light, which can easily cause glare.



For further information on glare, refer to Snag 34.

For information on how the mounting height of an emergency lighting luminaire affects the maximum spacings between luminaires, refer to Snag 33.

For details on the minimum illuminance required in escape routes, refer to Snag 11.

Photometric data

Reputable manufacturers of emergency lighting luminaires publish photometric data to help designers determine how many luminaires will be needed to meet minimum levels of illumination.

Snag 33

In some situations, because the spacing distances between emergency luminaires is too great, the minimum levels of illuminance specified in *BS 5226-1*, cannot be met.

Solution

To provide designers with accurate information on spacing distances, reputable manufacturers of emergency luminaires publish photometric data for their range of emergency luminaires.

The following table and illustration provide examples of the form in which such data is usually presented. In this form, the data gives the distance that should not be exceeded from a wall or door to the first luminaire, and then to the next luminaire. These distances are given for a range of different luminaire mounting heights, and are for luminaires oriented either parallel to the route (axial) or at right angles to the route (transverse).

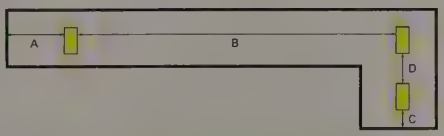
The distances for open areas is given in the bottom third of the table.

Reputable manufacturers of emergency luminaires have their products independently tested by British Standard Institution (BSI) or an equivalent test house to prove that the photometric performance of their luminaires meets the specified light distribution, and the initial and end of life total light outputs. From this data, the manufacturers construct tables to allow easy design for installers. The accuracy of the tables is independently verified by ICEL, the Industry Committee for Emergency Lighting.

These figures are examples only and must not be used for design or verification purposes

Escape routes

Ceiling mounting height Metres	Transverse to wall A	Transverse to transverse B	Axial to wall C	Axial to Axial D
1 lux minimum along centre line				
	2.7	7.2	1.5	4.6
	2.1	7.5	1.7	4.8
6.0	–	5.3	–	3.7
Open areas 0.5 lux minimum in central core				
2.5	2.5	8.5	2.3	7.4
4.0	2.6	9.8	2.3	8.6
6.0	1.8	10.3	1.6	9.5



Disability glare

An emergency luminaire should be selected and positioned carefully so that the light produced by it when in operation will not dazzle anyone.

Snag 34

In some circumstances, due to an incorrect mounting height, position or type of emergency luminaire being used, occupants travelling towards, or along, an escape route can be dazzled by the intense bright light produced by a luminaire. *BS 5266-1* and *BS EN 1838* refer to this as 'disability glare'.

Where disability glare occurs, it can interfere with the observation of safety signs, routes and/or obstructions.

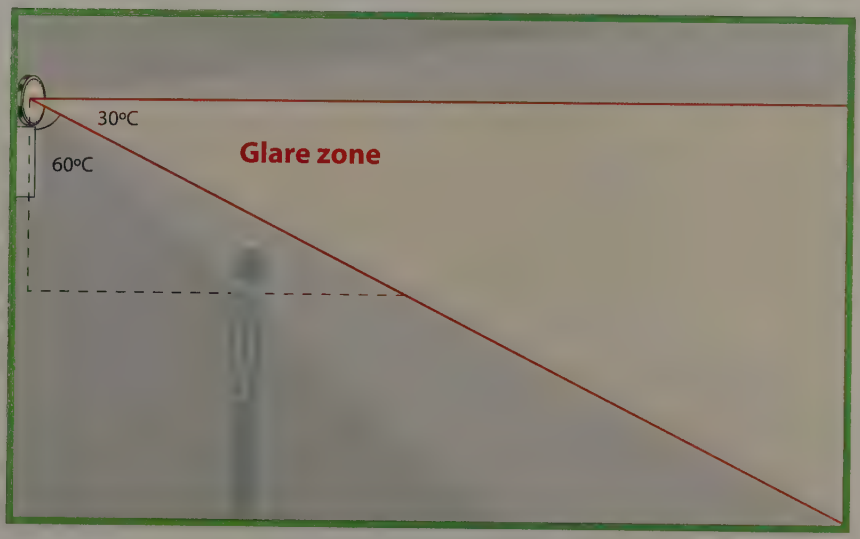
Solution

snag 34

Disability glare can occur when there is a high contrast between a luminaire and its background. Clauses 4.2.3 and 4.3.3 of *BS EN 1838* require glare to be kept low. So, where projector or high output luminaires are used, careful consideration must be given to their required mounting height, as they can produce intense narrow beams of light that can easily cause glare. For this reason, Clause 5.2.4 of *BS 5266-1* recommends that such luminaires should be located at least 30 degrees out of direct line of sight when observing the escape route.

On a level, horizontal escape route, or in an open area or high risk task area, the luminous intensity (in candelas) of **all** luminaires in that area must not exceed the maximum values given in Table 1. These values are contained in *BS EN 1838* and apply within the zone 60° to 90° from the downward vertical at all angles of azimuth – see Fig 1.

Fig 1



Where an escape route (or open area) is not flat and/or includes steps or gradients, as shown in Fig 2, Clause 4.2.3 of *BS EN 1838* requires the limiting values given in Table 1 not to be exceeded for all angles (not just the 60 to 90 degree zone).

Limits of disability glare

Table 1

Mounting Height above floor level	Escape routes and open areas	High risk task area lighting
metres	Maximum luminous intensity I_{max} cd	Maximum luminous intensity I_{max} cd
Less than 2.5	500	1000
2.5 up to 3	900	1800
3 up to 3.5	1600	3200
3.5 up to 4.0	2500	5000
4.0 up to 4.5	3500	7000
4.5 and above	5000	10000

Fig 2

BS EN 1838:2013

BSI Standards Publication

Lighting applications — Emergency lighting

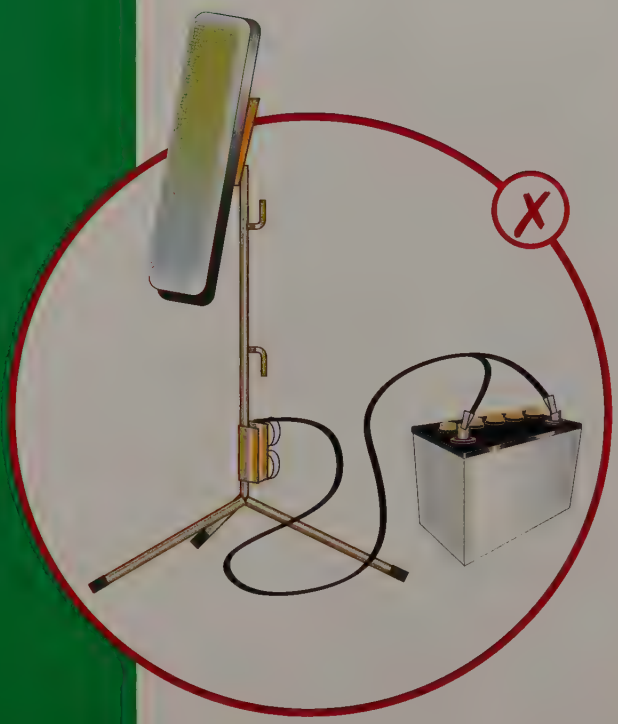
bsi.

Batteries

Batteries that provide the standby power supply for emergency luminaires must be able to operate when required.

Snag 35

In some cases, an emergency luminaire can fail to operate when required to do so because the standby battery has been replaced with one of an unsuitable type.



Solution

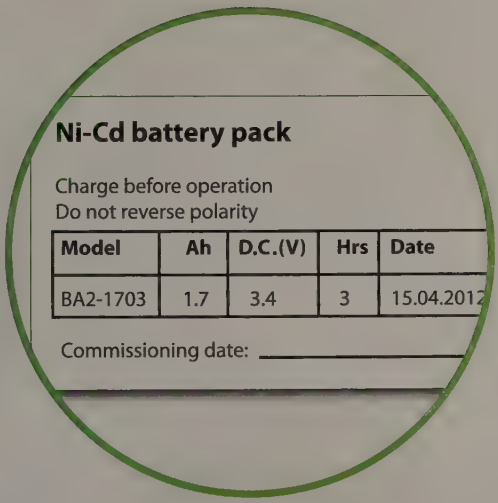
Standby batteries may be used to supply self-contained or centrally supplied emergency luminaires.

Such batteries should be correctly used and, at the end of their declared life, be replaced with batteries of a suitable type, to ensure that the performance of the emergency lighting system is not adversely affected.

Clause 7 of *BS 5266-1* provides specific recommendations for standby batteries, depending on the type of emergency lighting system used. These recommendations are summarised as follows:

Self-contained luminaires

Batteries that are suitable for self-contained emergency luminaires are specified in Annex A of *BS EN 60598-2-22: 2014* and should have a minimum life expectancy (as declared by the manufacturer) of four years when operated in the luminaire.



To ensure that the correct type of battery is used, Clause 22.6.7 of *BS EN 60598-2-22* requires emergency luminaires to be clearly marked with the details required for battery replacement.

Except for a luminaire that contains a non-replaceable battery, batteries for self-contained luminaires should be marked to indicate their type, rating, and the year and month (or week) of manufacture. Space should also be provided on each battery for the date of commissioning to be inserted by the installer or commissioning engineer.

Annex A (A.9) of *BS EN 60598-2-22* states that the battery of a self-contained luminaire is not considered to be a user serviceable item and that it should therefore be replaced by a competent person only, who should then follow the instructions on the battery for its correct disposal.

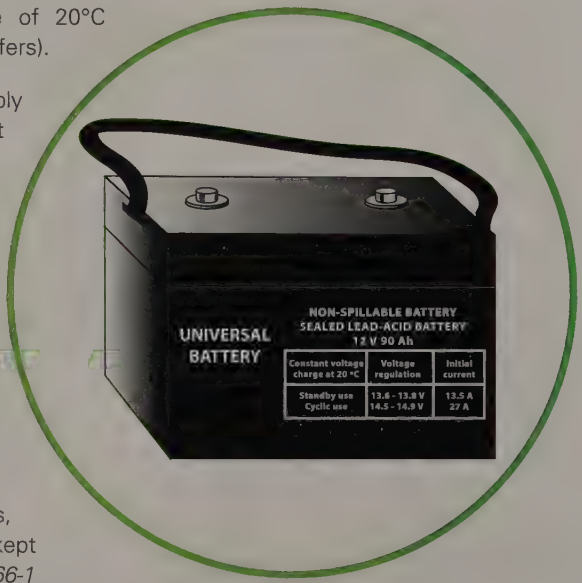
A battery that is located within a luminaire is more likely to be exposed to the effects of temperature. Where the rated working temperature of the battery is exceeded, its performance may be significantly reduced.

Central battery supply systems

Batteries suitable for central power supply systems are specified in *BS EN 50171: 2001.*

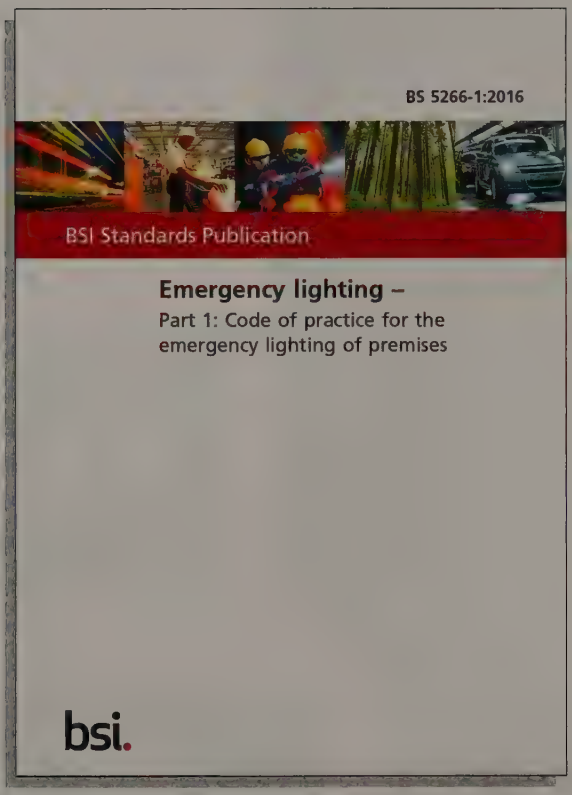
In a central power supply system that supplies essential safety equipment without any restriction on the output power, the batteries should be of a type that has a declared minimum life expectancy of 10 years at an ambient temperature of 20°C (Clause 7.2.2 of *BS 5266-1* refers).

In a central low power supply system, where the output power of the supply is limited to 500 W for 3 hours or 1500 W for 1 hour, the batteries should be of a type that has a declared minimum life expectancy of five years at an ambient temperature of 20°C.



To ensure emergency systems can be restored as quickly as possible, spares for components such as batteries, fuses and lamps, should be kept on site (Clause 13.4 of *BS 5266-1* refers).

Note: The batteries of a centrally supplied system should be regularly maintained under the supervision of a competent person, refer to Snag 43.



Escape route signs

Signs used to identify escape routes should be consistent, clear and unambiguous.

Snag 36

Where escape route signs having different styles and formats are present within a single emergency lighting installation, persons seeking to evacuate the premises in an emergency might become confused.

Solution

To support persons to proceed to a place of safety in emergency conditions the information displayed on escape route signs should be clear and unambiguous. For these reasons, Clause 5.2.9.1.1 of *BS 5266-1* recommends that escape route signs designated as E001 and E002 in *BS EN ISO 7010: 2012+A5* are used, with the appropriate directional arrow in accordance with Table 1 of *BS 5499-4: 2013*.

Where direct sight of an emergency exit is not possible, an illuminated directional sign (or series of signs) should be provided to assist progression towards the emergency exit. The purpose of the directional arrow is to indicate the direction of travel to a place of safety. The colorimetric and photometric characteristics of escape route signs should comply with Clause 5.2.9.1.2 of *BS 5266-1*.

Escape route sign – conforming to *BS EN ISO 7010: 2012 (E001/ E002)* with directional arrow

The purpose of the supplementary text is to aid understanding of the graphical symbol. 'Exit' is used to indicate a doorway or opening that leads to a place of safety for a route normally used to enter or leave the building, whereas a doorway that is used specifically as an alternative exit for evacuation purposes should be signed 'Fire exit' (Clause 4.7 of *BS 5499-4* refers).

It should be appreciated that for existing installations signs complying with the previous edition of *BS 5266-1* do not need to be replaced, unless a need is identified during the fire risk assessment. However, to minimise the risk of confusion arising, signs based on one format should not be mixed with signs of another format, within a single installation. Where a text only exit sign is encountered within an installation it should be replaced.

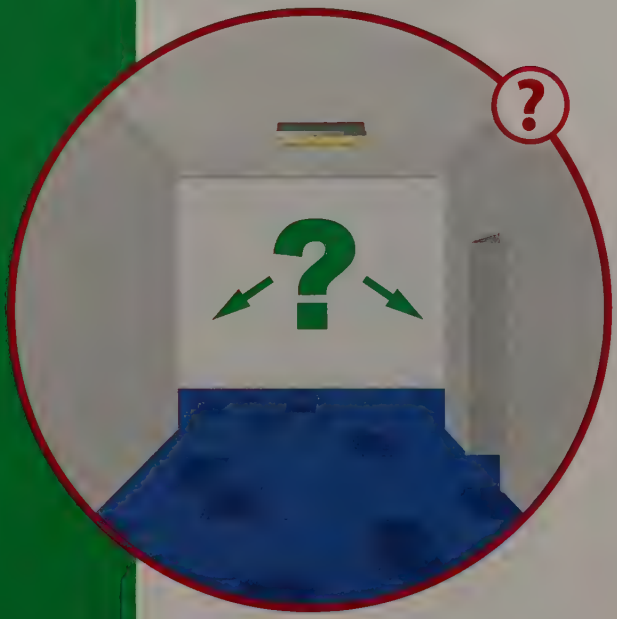
Note: Safety signs other than escape route signs are covered by *BS 5499-10: 2014* (Clause 5.2.9.2.1 of *BS 5266-1* refers).

Location of escape route signs

Escape route signs should be located so that they assist persons to proceed readily towards a final exit without confusion.

Snag 37

Failing to provide and position signs at appropriate points along an escape route may cause some individuals to panic in an emergency situation.



Solution

To minimise the risk of confusion in emergency conditions, escape route signs should be located in accordance with *BS 5499-4: 2013* (Clause 5.2.9.1.1 of *BS 5266-1* refers).

Where persons travelling along the escape route have a choice of direction (or door) an escape route sign should be visible. Further principles that should be applied when locating escape route signs are contained in Clause 4.5 of *BS 5499-4*, which include, among others, locating signs:

- where confusion could occur as to which direction/doorway leads to the escape route, and
- at all changes of direction in corridors, stairways and open areas and
- where direct sight of the escape route is obstructed.

To support persons in emergency conditions, the signs should be evenly spaced and consistently located so that persons can readily predict the location of the next sign, but they should not be fixed to doors or sited where they could be obscured by opening doors.

In order to enable persons to readily view the signs above the heads of others, signs above doors or in open spaces should be mounted between 2 m and 2.5 m, from the finished floor to the base of the sign, and for wall mounted signs, the measurement should be adjusted to between 1.7 m and 2 m so that the sign is in the immediate field of vision (Clause 4.6 of *BS 5499-4* refers).

In some locations, such as in large open areas, signs may be positioned higher than 2.5 m, however, to ensure the sign is readily identifiable it may need to be larger.

Note: Safety signs other than escape route signs should be located and operated in accordance with *BS 5499-10: 2014.*

Illumination of safety signs

Safety signs required to provide information in an emergency situation should be adequately illuminated and visible.

Snag 38

Where emergency exit and directional signs are not adequately illuminated and visible during emergency conditions, occupants may struggle to find their way to a place of safety when necessary to do so.

Solution

Safety signs intended to provide information during emergency conditions should be illuminated and visible to occupants at all material times. Such safety signs can be either internally illuminated, or externally illuminated by means of an emergency luminaire located within 2 m of the sign (measured horizontally).

In either case, Clause 5.4.6 of *BS EN 1838: 2013* specifies that, as soon as there is a failure of the supply to the normal lighting, safety signs must be illuminated to at least 50 % of their required luminance within five seconds and full luminance within one minute. Wherever a safety sign is externally illuminated, a minimum illuminance of 5 lux should be maintained on every part of the sign face throughout the emergency condition (Clauses 5.2.9.1.2 (c) and 5.2.9.2.2 (c) of *BS 5266-1* refer).

Depending on the outcome of a fire safety risk assessment, other safety signs may also need to be illuminated during emergency conditions. Such safety signs, which might include those used to highlight fire fighting equipment, fire alarm call points and/or first aid stations, should be located and operated according to *BS 5499-10* (Clause 5.2.9.2 of *BS 5266-1* refers).

Maximum viewing distance

Emergency escape signs and emergency exit signs should be visible and easily identifiable at all material times.

Snag 39

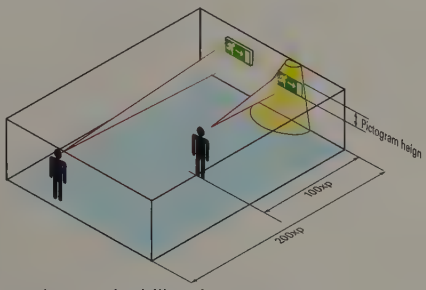
Where the maximum permitted viewing distance of an emergency escape sign or emergency exit sign is exceeded, occupants may struggle to move to a place of safety in the event of an emergency.

Solution

To ensure emergency escape signs and emergency exit signs can be easily seen and their instructions followed in an emergency situation, the maximum permitted viewing distance of the signs (for persons directly facing the signs) should be determined from the sign height in accordance with the recommendations given in Clause 6 of *BS 5499-4: 2014* (Clause 5.2.9.1.3 of *BS 5266-1* refers).

For escape route signs that are powered internally or those externally illuminated the value of distance factors used in Clause 5.5 of *BS 1838: 2013* may be used to determine the maximum viewing distance using the following formula:

$$d = s \times p$$



Where:

d is the maximum permitted viewing distance

s is a constant, which is either:

- 100 for externally illuminated signs (when the vertical illuminance on the sign is at least 5 lux) or
- 200 for internally illuminated signs (when the mean illuminance of the white contrast colour is not less than 100 cd/m^2) .

p is the sign (pictogram) height, in metres (m)

For an internally illuminated sign that has a pictogram height of 180 mm the maximum viewing distance can be determined as follows:

d = 200 × 0.18 = 36 m

For an externally illuminated sign of the same size (pictogram height of 180 mm), the maximum viewing distance can be determined as follows:

d = 100 × 0.18 = 18 m

From the above calculations it can be seen that, for signs having the same pictogram height, the maximum permitted viewing distance for an externally illuminated sign is half that for an internally illuminated one.

Where a sign is not viewed directly, Clause 5.2.9.2.3 of *BS 5266-1 re*commends that a correction factor, based on the cosine of the viewing angle, is applied to the calculation, as detailed in Annex C of *BS 5499-4*.

Keeping records – Log book

An emergency lighting log book should be kept up-to-date with all the relevant details associated with maintaining and testing the emergency lighting system.

Snag 40

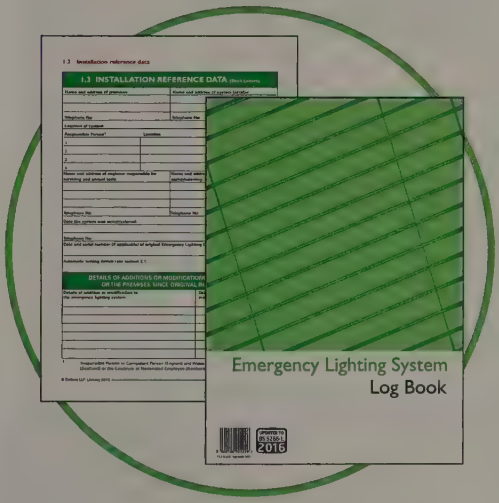
Failure to keep up-to-date records of, for example, the dates and brief details of each service and the results of tests performed on the emergency lighting system could make it difficult for the responsible person to prove that the emergency lighting system was being properly maintained.

Solution

In accordance with Clause 11 of *BS 5266-1* and Clause 6.3 of *BS EN 50172*, an emergency lighting log book should be kept on the premises in the care of a responsible person appointed by the occupier/owner of the premises, and made available for examination by any suitably authorised person (such as an officer from the fire and rescue service).

A log book in either written or electronic format should include the details of the installer and the person/organisation responsible for maintaining the emergency lighting system. It should also include, as a minimum, the:

- date the system was commissioned and, where any alteration was undertaken, the details of the work carried out and the date the work was completed
- dates of all periodic inspections and tests
- service details of the system, with dates
- records and dates of all defects and remedial actions taken
- details of any automatic testing devices such as mode of operation.



A log book can also be used to record the replacement of component parts (e.g. a lamp, battery or fuse).

A log book and any other documentation (including the design, installation and verification declarations) associated with the emergency lighting system should be provided to the responsible person during the handover stage of a new emergency lighting installation or following a major alteration to an existing system. Information on a typical log book is contained in Annex J of *BS 5226-1*.

The person receiving such documentation should be made aware of the importance of maintaining the emergency lighting system, and for records to be kept up-to-date and for them to be stored in a safe place (Clause 10.7 of *BS 5266-1: 2016* refers).

Testing of emergency lighting systems

Each emergency lighting installation should incorporate a sufficient number of test facilities to simulate a failure of the normal lighting supply.

Snag 41

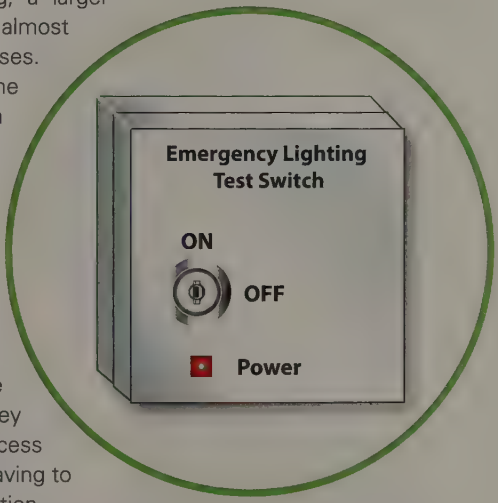
Failure to provide a a sufficient number of appropriate test facilities to check the operation of emergency luminaires may cause unnecessary disruption to the occupants.

Solution

In order to confirm the operation of each emergency lighting luminaire, Clause 8.3.3 of *BS 5266-1* recommends that a suitable means should be provided to simulate a failure of the supply to the local lighting circuit, without interruption of the normal supply. The practice of switching off a circuit-breaker or removing a circuit fuse to simulate the failure of the normal supply is **not** considered an acceptable way of checking the operation of emergency luminaires.

Where the layout of a building is simple and the emergency luminaires can be easily observed (for example in a small office or shop) the use of one or two key operated switches to interrupt the supply to the emergency luminaires may be appropriate.

However, for a more complex building, a larger number of key operated switches will almost certainly be needed throughout the premises. Each key switch can be used to control one or more emergency luminaires serving a particular area, room or corridor, which helps to prevent the batteries in all of emergency luminaires discharging together.



Automatic testing facilities are also available and, depending on the complexity of the building, can prove to be more efficient and less disruptive than using manual test facilities such as key switches. For example, an automated process is not reliant on a competent individual having to perform the tests and record the information.

Automatic test devices should conform to *BS EN 62034: 2012 Automatic test systems for battery powered emergency escape lighting.*

Note: Automatic test systems should be provided where occupants are expected to stay in place during a supply failure (Clause 4.1 (note 3) of *BS 5266-1* refers).

Routine inspection and testing of an emergency lighting system

All emergency lighting luminaires should be regularly energised from their standby power supply, to confirm that they are in good working order.

Snag 42

Where the operation of emergency luminaires are not checked on a regular basis, it is likely to result in defects and any faults with the luminaires going unnoticed.

Solution

An emergency lighting installation should be inspected and tested regularly in accordance with *BS EN 50172*, to confirm that the system operates correctly and to ensure that any faults and/or defects are observed and rectified at an early stage (Clause 12 of *BS 5266-1* refers).

To ensure that the system is correctly maintained, a competent person should be appointed (by the responsible person) to perform the monthly tests on the emergency lighting system, (Clause 13 of *BS 5266-1* refers).

As a minimum, Clause 7.2 of *BS EN 50172* requires the following routine inspections and tests to be undertaken:

Daily

- The indicators of a central power supply should be *visually* inspected to check the system for correct operation.

Monthly

- Each emergency luminaire and internally illuminated exit sign should be switched into emergency mode and supplied from its own battery.
- Failure of the supply to the normal lighting should be *simulated* for a period long enough to ensure that each lamp is illuminated.
- All luminaires should be checked to ensure that they are present, clean and functioning as intended.
- At the end of the test period, the supply to the normal lighting should be restored and any indicator lamp or device used to indicate that the normal supply has been restored must be checked.
- For central battery systems, the correct operation of system monitors must be checked.

Annually

- Same as for the monthly tests, but each luminaire and internally illuminated sign should be tested for its full rated duration in accordance with the manufacturer's information.

Note: Whenever possible a full duration test should be performed at a time followed by a period of low risk to ensure batteries fully recharge before normal occupancy resumes.

- The supply to the normal lighting should be restored and any indicator lamp or device checked to ensure that it is showing the normal supply has been restored. The charging arrangements should be checked for proper functioning.

- The date of the test and any results should be recorded in the system log book.

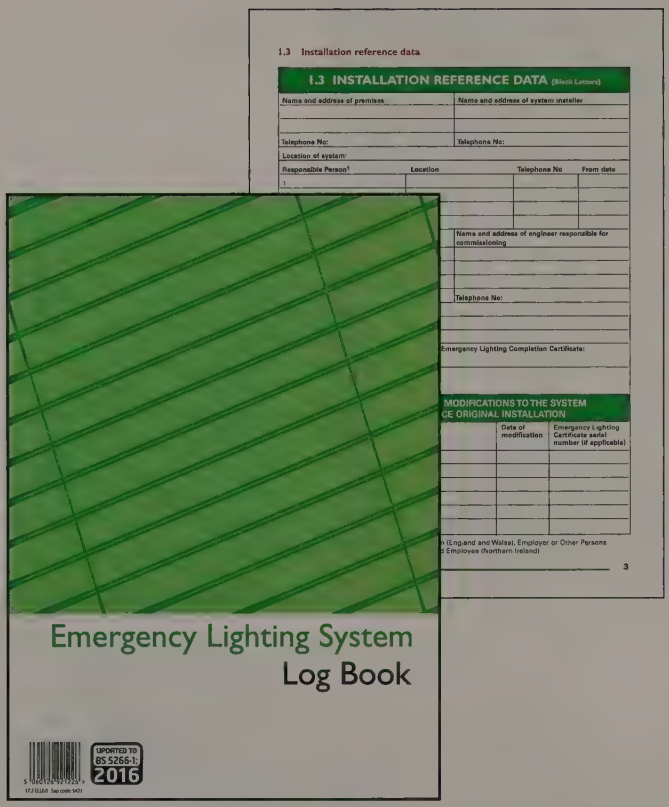
Generators

Generating sets should be regularly serviced in accordance with the manufacturer's instructions.

Clause 10.7 of *BS 5266-1* recommends that the competent person handing over the system to the responsible person should instruct or where necessary train the responsible person(s) on the regular monthly routine inspection and test procedures. Including how to operate the manual test facilities or, where appropriate, to check the operation of the automatic testing facilities.

The results of routine inspections and tests, together with the details of any remedial works undertaken, should be entered in to the emergency lighting test log book.

For further information on the emergency lighting test log book, and what details should be recorded, refer to Snag 40.



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Servicing of a standby power supply

A standby power supply, such as a bank of batteries or a generator, must be maintained in good working order.

Snag 43

Where the standby power supply of an emergency lighting system is not regularly serviced and maintained, there is an increased risk that it will fail to operate when needed.

Solution

To minimise the risk of a standby supply failing to operate correctly in the event of an emergency, Clause 7.1 of *BS EN 50172: 2004* requires the owner/occupier of the premises to instruct a competent person to oversee the servicing of the emergency lighting system, which includes the servicing of the standby power supply, where applicable.

Clause 13 of *BS 5266-1* includes particular recommendations for the servicing of central supply batteries and generators which are detailed as follows.

Servicing a central battery

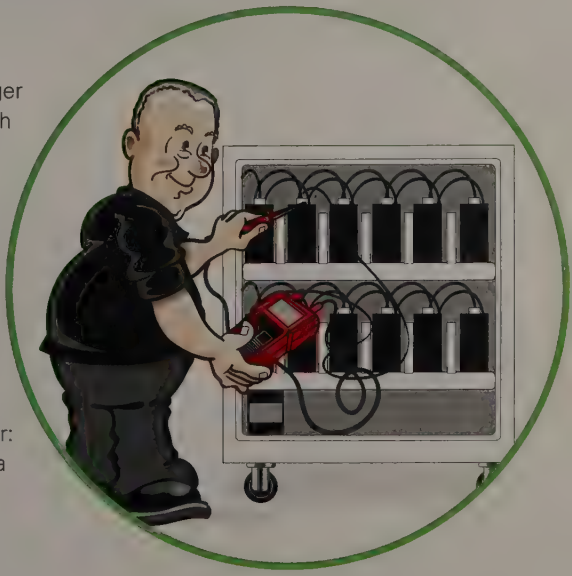
Clause 13.3.2 of *BS 5266-1* recommends that all the following checks should be carried out on the central battery, where appropriate, based on the manufacturer's guidance:

a) The electrolyte should be maintained at the correct level, as specified by the manufacturer.

b) The battery case should be checked regularly for signs of cracks or leaking and the terminals and tops should be kept clean.

c) The battery and battery charger must be compatible with each other, and this should be confirmed when replacing either component (any replacement cell would also need to be compatible with the battery).

d) The replacement battery must be a suitable type as specified by the manufacturer: an automobile battery is not a suitable replacement.



Servicing a generator

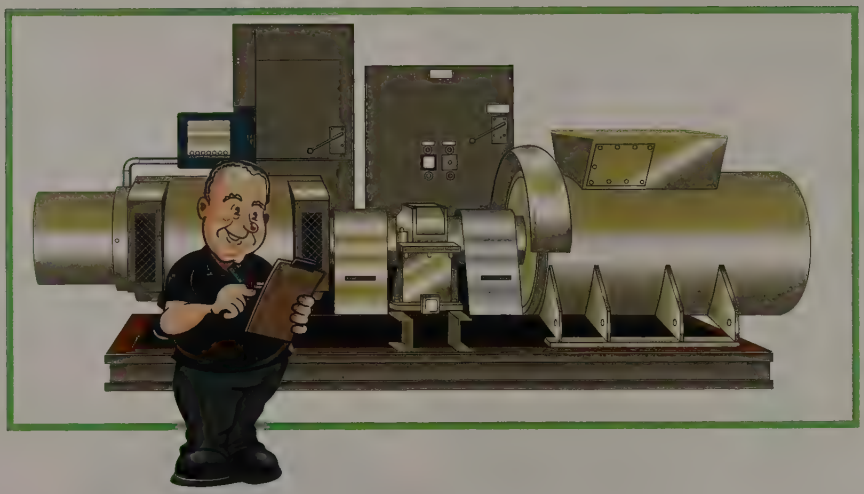
Where a standby generator is not maintained or regularly serviced, it might fail to start when required to do so. For this reason, Clause 13.3.3 of *BS 5266-1* recommends that the manufacturer's servicing instructions should be followed carefully. In particular, the generator should be checked regularly, by a competent person, to confirm that:

- all electrical connections are mechanically and electrically suitable for use. The effects of vibrations (or even the effects of the harmonics produced by the generator) can over time loosen the output terminals of the generator.

- the generator is suitably protected (correct IP rating) for the environment that it is installed in, as the effects of damp, humidity (causing condensation) or dust can disrupt the operation of the generator. Regular cleaning of the generator is therefore advised, and all air intakes and exhausts should be free from obstruction.

The generator should be tested under load conditions for a period of time as determined by the manufacturer. Testing the generator unloaded does not verify that it will operate correctly in an emergency.

Note: Where a generator set is used to provide a standby supply, reference should be made to the international standard for generating sets, *ISO 8528-12*.



Full duration test

Before a full duration test is carried out on an emergency lighting system, consideration must be given to the time it takes for any standby battery supply to recharge.

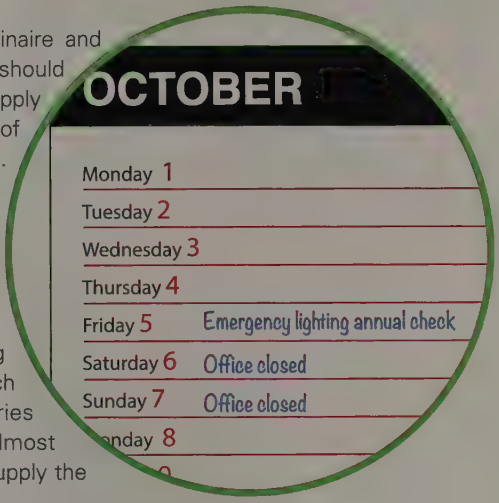
Snag 44

Should the normal lighting supply fail shortly after a full duration test has been conducted, the standby batteries may not have sufficient capacity to supply the emergency luminaires for the required period.

Solution

To confirm that an emergency lighting system is capable of operating for the time necessary to allow occupants to make to a place of safety in the event of an emergency, Clause 7.2.4 of *BS EN 50172: 2004* requires a full duration test to be carried out on the emergency lighting system at least once a year, (Clause 12 of *BS 5266-1* refers).

During the test, each emergency luminaire and each internally illuminated safety sign should be operated from its emergency supply (battery) for the full duration period of the emergency supply (1 or 3 hours). The results of the test and any findings should be recorded in the emergency lighting system test log book.



When planning a full duration test, consideration should be given to the risk of the supply to the normal lighting failing shortly after the test. In such circumstances, the standby batteries (drained during the test) would almost certainly have insufficient capacity to supply the emergency luminaires once again.

So, to minimise the risk of occupants being plunged into darkness in such circumstances, Clause 12 of *BS 5226-1* recommends that the duration test is performed at times of minimal risk such as when the building is unoccupied, or emergency luminaires are tested alternately so that the luminaires being tested have charged luminaires next to them.

An automatic test system (ATS) may be used to do a full duration test, provided it complies with all of the relevant requirements of *BS EN 62034*.

Note: Automatic test systems are preferred in premises where a 'stay put strategy' is in place. Annex B of *BS 5266-1*, contains guidance on suitable types of systems.

Verifying illuminance by measurement

Illumination levels of an emergency lighting system can be determined by measurement, using an appropriate light meter.

Snag 45

Although, measurements may be used to verify illuminance, unless the procedure and instruments used are appropriate for the installation, the results obtained are likely to be inaccurate.

Solution

Where authenticated photometric data from, for example, one of the sources referred to in Table 1 is not available for the luminaires of an emergency lighting system, the illuminance provided by the system may be determined by measurement, using an appropriate light meter and method.

Table 1: Examples of recognised sources of photometric data

1	Authenticated spacing data such as the Industry Committee for Emergency Lighting (ICEL) 1001 registered tables.
2	Calculations as detailed in Annex D of *BS 5266-1:* 2016 and the Chartered Institution of Building Services Engineers (CIBSE) / The Society of Light and Lighting Guide LG12: *Emergency Lighting Design Guide.*
3	Printed results from recognised commercial emergency lighting design software.

However, it should be appreciated that it can be difficult to obtain accurate results by measurement, so good instrumentation and care are needed (Annex D of *BS 5266-1* refers). For instance, the effect of external sources of light such as from the Moon or street lights can substantially influence measurements. So, as far as practicable, such stray light should be screened out.

Annex D of *BS 5266-1* provides guidance on measuring illuminance and advises that measurements should be taken at specific areas that are likely to have minimum illuminance, including:

- half-way between emergency luminaires, especially in stairwells
- at changes in direction of the escape route
- at thresholds of doorways forming part of the exit route
- where the widest spacing of luminaires occurs, and
- where the highest mounted emergency luminaires.

All illuminance measurements should be undertaken with a cosine photopic V(λ)-corrected meter having a range between 0.01 lux and 100 lux, and a sensitivity of 0.01 lux. The luminaires should be on for at least an hour to allow for the lamps to stabilise and measurements can be taken up to 20 mm above the same plane that was used for design. To prevent readings being affected by shadows, a meter with a remote sensor is preferred.

Certificates for an emergency lighting system

An Emergency Lighting Completion Certificate should be issued for every new emergency lighting installation (or part thereof) or a major alteration to an existing installation.

Snag 46

Following the completion of a new electrical installation that incorporates a number of self-contained emergency luminaires, some installation designers have only issued an Electrical Installation Certificate.

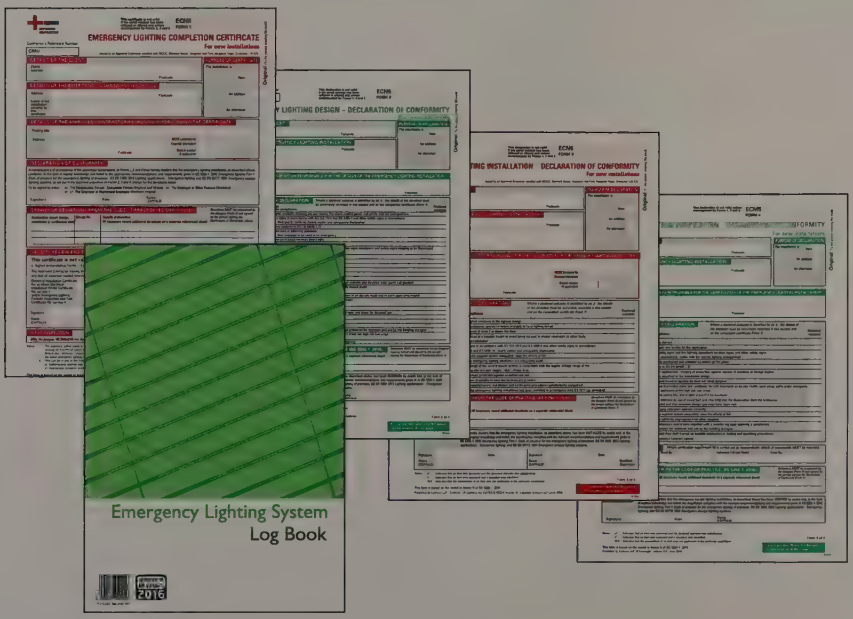
Solution

On completion of a new emergency lighting system or for new work associated with an alteration or an addition to an existing emergency lighting installation, an appropriate Emergency Lighting Completion Certificate should be issued in accordance with Clause 11 of *BS 5266-1*. For such purposes, the NICEIC Emergency Lighting Completion Certificate and Associated Declaration Forms, based on the model contained in *BS 5266-1*, may be used.

The NICEIC Emergency Lighting Completion Certificate and Associated Declaration Forms

The Emergency Lighting Completion Certificate (Form 1) is only valid when it is accompanied by, the following:

- signed declarations of design (Form 2), installation (Form 3), and verification (Form 4), and
- the photometric design data, and
- a test log book.



Models of Forms 1, 2, 3 and 4 are given in Annex H of *BS 5266-1: 2016*.

An Emergency Lighting Completion Certificate provides a formal declaration that the emergency lighting installation to which the certificate relates has been designed, constructed and verified in accordance with the relevant recommendations and requirements given in *BS 5266-1, BS EN 1838 and BS EN 50172/BS 5266-8.*

Upon completion and verification of the installation, the Emergency Lighting Completion Certificate, and other forms of documentation, as appropriate, should be completed and issued to the occupier/owner of the premises or their representative as identified in the Declaration of Conformity (Form 1).

To simplify the certification of small emergency lighting installations a two-part completion certificate may be used, as appropriate, refer to Snag 47.

The Emergency Lighting Completion Certificate should not be used for the periodic inspection of an existing emergency lighting installation, for which a Periodic Emergency Lighting Inspection and Testing Certificate should be issued (see Snag 48).

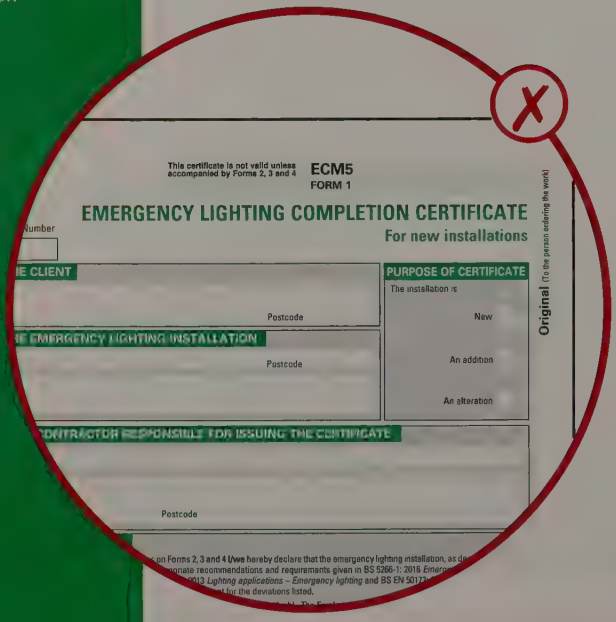
Note: The electrical installation work associated with a new emergency lighting installation, or an alteration or addition to an existing emergancy lighting installation, to which an Emergency Lighting Completion Certificate relates, must be covered by a separate Electrical Installation Certificate (or Minor Electrical Works Certificate where appropriate) in accordance with *BS 7671* Requirements for Electrical Installations (Regulation 631.1 refers).

Certifying small emergency lighting systems

A two-part completion certificate may be used for the certification of small new self-contained emergency lighting installations.

Snag 47

Not recognising that *BS 5266* permits small emergency lighting systems to be certified by a two-part certificate may result in unnecessarily compiling and issuing a multiple (four-part) Emergency Lighting Completion Certificate (ELCC) to certify a small emergency lighting system.



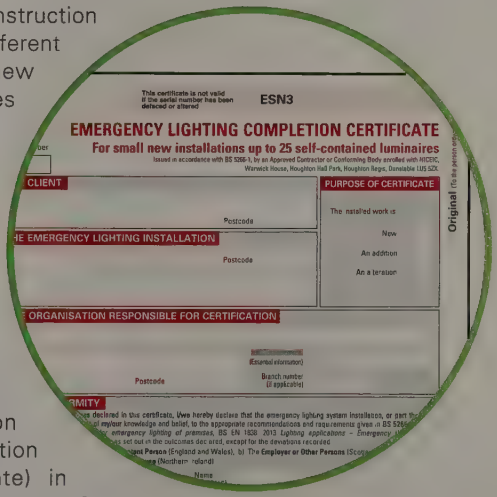
Solution

Persons certifying small systems; that is those consisting of no more than 25 self-contained emergency luminaires, should be aware that in certain circumstances a two-part completion certificate, which provides a simpler alternative to the multiple ELCC, can be issued to the client.

Based on the model form in Annex I of *BS 5266, the NICEIC Emergency Lighting Completion Certificate for small new installations up to 25 self-contained luminaires* is designed as a single signature certificate for the initial certification of a new emergency lighting installation or for new work associated with an alteration or addition to an existing system, in circumstances where:

- the design, construction and inspection and testing of the small emergency lighting installation is the sole responsibility of the person/organisation issuing the certificate, and
- the new installation is small, that is comprised of no more than 25 self-contained emergency luminaires.

Where the aspects of design, construction and verification are undertaken by different contractors/parties or where the new emergency lighting installation includes more than 25 emergency luminaires then the multiple ELCC, as detailed in Snag 46, should be used.


This certificate is not valid if the serial number has been defaced or altered

ESN3

EMERGENCY LIGHTING COMPLETION CERTIFICATE

For small new installations up to 25 self-contained luminaires

Issued in accordance with BS 1058-1, by an Approved Contractor or Conforming Body enrolled with NICEIC,

Warwick House, Houghton Hall Park, Houghton Regis, Dunstable LU5 5ZX.

CLIENT

Postcode

PURPOSE OF CERTIFICATE

The installed work is

New

An addition

An alteration

Original (To the person ordering the work)

HE EMERGENCY LIGHTING INSTALLATION

Postcode

ORGANISATION RESPONSIBLE FOR CERTIFICATION

(Essential information)

Postcode

Branch number (if applicable)

RMITY

declared in this certificate, I/we hereby declare that the emergency lighting system installation, or part th

of my/our knowledge and belief, to the appropriate recommendations and requirements given in BS 5266

emergency lighting of premises, BS EN 1838 :2013 Lighting applications – Emergency li

as set out in the outcomes described, except for the deviations recorded.

nt Person (England and Wales), b) The Employer or Other Persons (Scotl

g (Northern Ireland)

Name

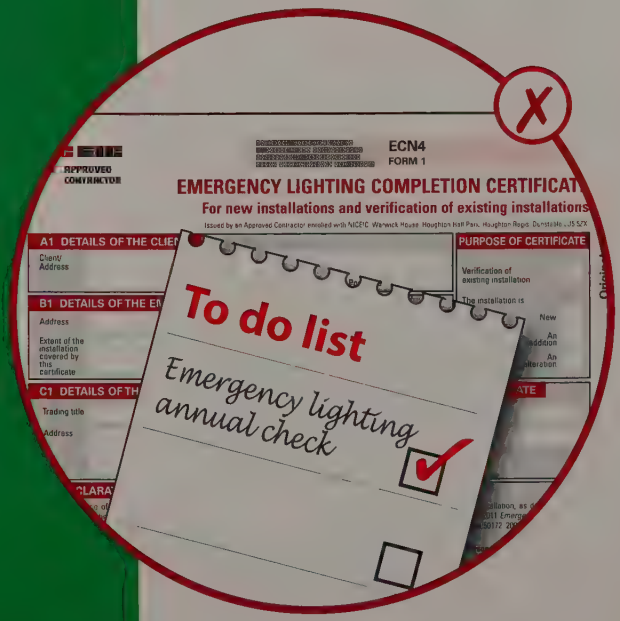
It should be noted that electrical installation work associated with a small emergency lighting installation, or a small alteration or addition to an existing emergency lighting installation, to which the certificate relates must be certified by a separate Electrical Installation Certificate (or Minor Electrical Installation Works Certificate, where appropriate) in accordance with *BS 7671 Requirements for Electrical Installations* (Regulations 631.1 and 631.3 refer).

Periodic inspection and testing of an emergency lighting installation

An emergency lighting installation should be inspected and tested by a 'competent person' at least once a year, and an Emergency Lighting Periodic Inspection and Test Certificate issued.

Snag 48

Failure to issue the correct form of documentation after periodically inspecting and testing an emergency lighting installation may involve unforeseen liabilities at a later date.



Solution

An Emergency Lighting Periodic Inspection and Test Certificate is to be issued only for the periodic inspection and testing of an existing emergency lighting installation. It must not be issued for any of the following:

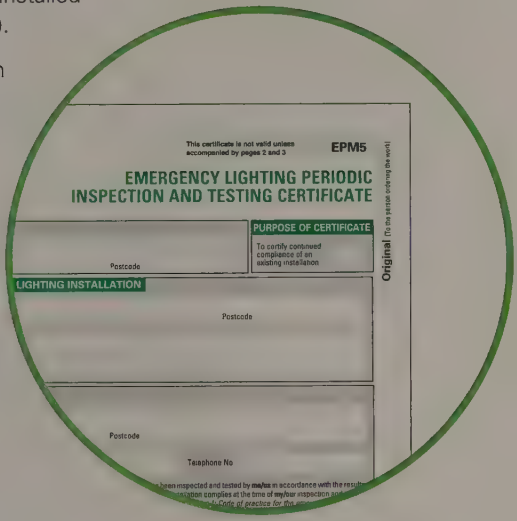
a) a new emergency lighting installation or

b) new work associated with an alteration or addition to an existing emergency Lighting installation or

c) verification of an existing installation (installed to a previous edition of the standards).

Upon completion of the annual inspection and test, the certificate should be compiled and passed to the person responsible for the installation (Clause 6.2 of *BS EN 50172: 2004* refers).

Any person(s) undertaking periodic inspection and testing of an emergency lighting system must have access to the principal technical reference documents relating to emergency lighting systems; correctly and consistently applying the design principles set out in those documents.


This certificate is not valid unless accompanied by pages 2 and 3

EPM5

EMERGENCY LIGHTING PERIODIC INSPECTION AND TESTING CERTIFICATE

Original (To be retained by the person ordering the work)

PURPOSE OF CERTIFICATE

To certify continued compliance of an existing installation

Postcode

LIGHTING INSTALLATION

Postcode

Postcode

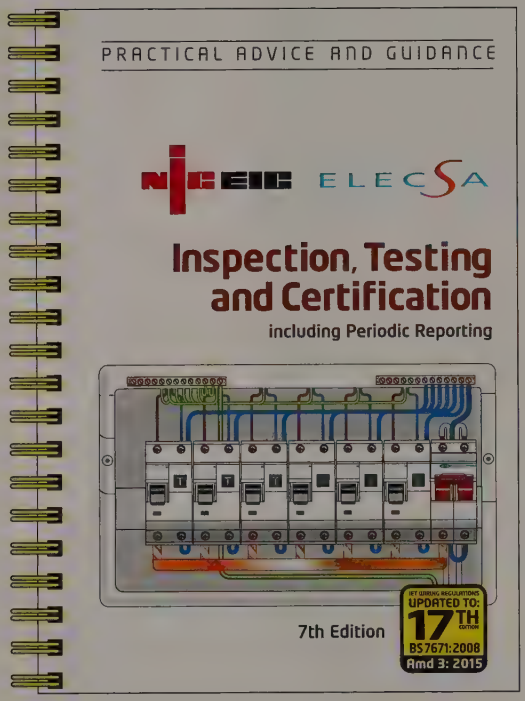
Telephone No

The principal technical reference documents for premises include:

- *BS 5266-1: 2016 Code of practice for the emergency lighting of premises*
- *BS EN 1838: 2013 Lighting applications. Emergency lighting*
- *BS EN 50172: 2004/BS 5266-8: 2004 Emergency escape lighting systems*
- *BS 7671: 2008, as amended, Requirements for Electrical Installations*
- *The Building Regulations applicable to the particular part of the UK.*

An Emergency Lighting Periodic Inspection and Test Certificate and supporting documentation provides continued evidence (along with the client's current 'Fire Risk Assessment') that the emergency lighting system has been inspected and tested, and continues to comply with the appropriate recommendations and requirements given in *BS 5266-1: 2016, BS EN 1838: 2013* and *BS EN 50172: 2004 (BS 5266-8: 2004)*.

The electrical installation associated with an emergency lighting system should also be subjected to periodic inspection and testing at appropriate intervals, to satisfy the requirements of Chapter 62 of *BS 7671*. The NICEIC book *Inspection, Testing and Certification* provides guidance in terms of the maximum intervals between initial certification and the first periodic inspection and testing of electrical installations for various types of premises. For the wiring of centrally supplied emergency lighting installations, the maximum interval to the first periodic inspection and test is normally 3 years. The interval recorded should take account of the available guidance material and any other special circumstances relating to the particular installation.



For a full range of certificates and publications visit the NICEIC website

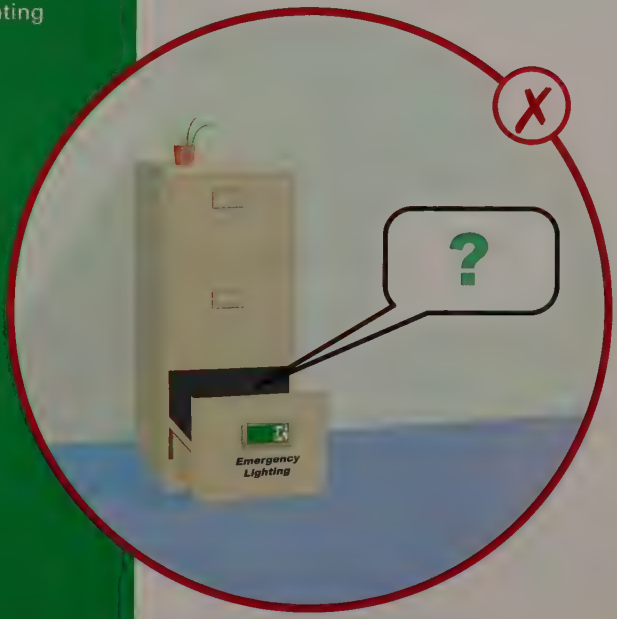
www.niceic.com

Verifying emergency lighting systems of existing premises

Premises that cannot provide valid emergency lighting documentation should be inspected for compliance with current emergency lighting standards.

Snag 49

In some circumstances, due to material changes that have been made to a building or its use, over time, the documentation held for the emergency lighting installation is no longer valid. Where this is the case, occupants could be placed at an increased risk in the event of failure of the normal lighting supply.



Solution

Where an existing premises cannot provide any valid emergency lighting system documentation, such as the original completion certificates, it should be inspected for compliance with current emergency lighting standards and on satisfactory completion a certificate of verification should be supplied to the owner/occupier (Clause 11 of *BS 5266-1* refers).

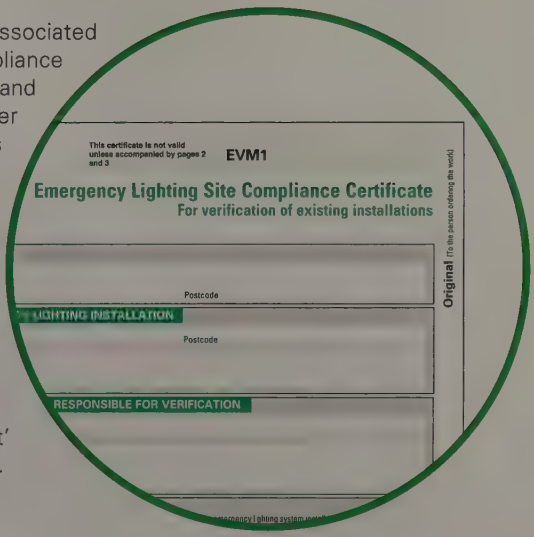
For such circumstances, the NICEIC *Emergency Lighting Site Compliance Certificate for verification of existing installations*, based on the model form contained in Annex K of *BS 5266-1*, may be used.

Verification of an existing system may be needed as a result of, for example:

- the emergency lighting documentation having been lost.
- a change of usage or layout, for example, due to the conversion of an office into a restaurant where the existing documentation may no longer remain valid.
- improvements to safety standards (or technology) that have been, over time, incorporated into the emergency lighting standards, such as, recommendations relating to high risk task areas and specific locations.

Where this is the case, completion of the 'Compliance checklist' ensures that any deviations that are present on the existing emergency lighting system are identified (promptly) to the owner/occupier, together with recommendations on the actions necessary to address them.

The completed certificate and associated documentation such as the compliance checklist, photometric design data and appropriate test log book together with the records of remedial works completed will then provide a substitute system of documentation that may be used, when necessary, to provide evidence of compliance with current emergency lighting standards.


This certificate is not valid unless accompanied by pages 2 and 3

EVM1

Emergency Lighting Site Compliance Certificate

For verification of existing installations

Original (To the person ordering the work)

Postcode

LIGHTING INSTALLATION

Postcode

RESPONSIBLE FOR VERIFICATION

To support the verification of an existing emergency lighting installation, additional guidance on completing the 'Compliance checklist' is contained in Annex L of *BS 5266-1*.

Low mounted way guidance systems

As smoke rises and spreads at ceiling level, the use of a low mounted way guidance system can assist occupants to move to a place of safety.

Snag 50

Where highly flammable chemicals and/or other materials are exposed to fire, high density smoke will be produced and spread rapidly, causing the light output from conventional overhead emergency luminaires to become obscured and make it difficult for occupants to identify or follow the designated escape route.

Solution

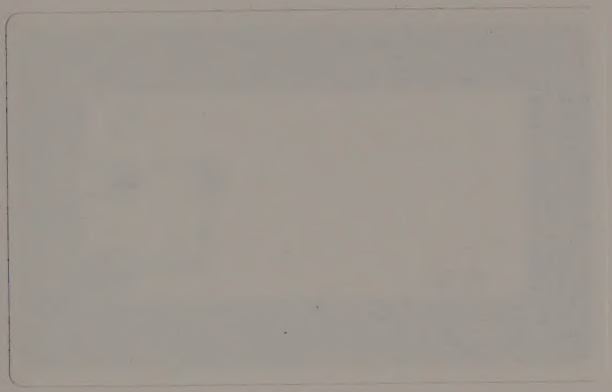
Research has shown that when a fire is well underway within a building, occupants will tend to stay close to the floor when moving towards, or along, an escape route. This is because the air is generally cooler at that level and the smoke, where present, is less dense.

For these reasons a source of light provided at or near to the floor by a low mounted way guidance system could be invaluable to occupants when trying to move to a place of safety. This is especially true where the light source from any overhead luminaires is scattered or obscured by smoke.

A low mounted way guidance system is intended to be used in conjunction with a conventional emergency lighting system. However, the former can be used on its own, provided that all of the relevant recommendations of *BS 5266-1: 2016* are complied with. Wherever installed, the use of a low mounted way guidance system should always be agreed with all interested parties, including any local enforcing authority.

Emergency low mounted way guidance systems largely comprise luminous tracks fitted into the floor or along the walls of a building and come into operation when either the supply to the normal lighting fails or as soon as smoke is detected.

For more information on low mounted way guidance systems, installation designers and specifiers should refer to *BS 5266-2: 1998, Emergency lighting. Code of practice for electrical low mounted way guidance systems for emergency use.*



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